Construction and Maintenance

Engineering and Highway Departments

Brick Resurfacing Methods in Illinois

THE Illinois Division of Highways has resurfaced over 60 miles of old pavement with brick this past summer. The jobs varied from ¼-mile to over 18 miles in length. All sections of old concrete pavement that have failed to such extent that they could not be considered adequate for foundation were taken out and replaced.

Concrete curbs were constructed which widened the road to meet present-day traffic standards. The curbs were extended under the edge of the old pavement for 6 inches and to a depth of 6 inches to support its edges against any tendency to further settlement. One ⅞-inch round steel continuous dowel was incorporated in each curb. A majority of the existing concrete slabs were 18 feet wide, and some were as narrow as 15 feet. The latter were constructed over ten years ago at the beginning of the Illinois highway program. The completed width of the brick resurfaced pavements is 20 feet.

After the curb was placed, all cracks, where replacement of the base was not necessary, were filled with concrete or bituminous material and the old pavement surface was evened up by the use of a mortar bed. This mortar bed served to take out some of the irregularities and rough spots in the old pavement, and in many cases eliminated minor settlements. This was placed in order to get a uniform depth of bitmuinous mastic under the brick.

The cushion or bedding course for the brick was a bituminous sand mastic with a minimum depth of ¾-inch and a maximum depth of 1½ inches; 1 inch being the depth desired. Bituminous sand mastic cushion has several advantages over plain sand cushion. It does not bulk when damp. It has structural stability to prevent shifting and prevent loss through cracks that may occur in the base. The Illinois Highway Department has specified mastic cushion on all brick resurfacing, and the results they are getting are most gratifying. The 2½-inch brick were laid on the mastic cushion and the joints filled with bituminous material. The surface of the finished road was not allowed to show variations of more than ⅛-inch in 10 feet.

Compacting Embankments

THE attitude of engineers and contractors toward placing embankments has been affected by past railroad practices. The flexibility of railroad embankments did not make compaction of prime importance; highway pavements, however, have different requirements, the same elevation is necessary without filling in the surface. The assumption that the action of the elements and traffic will bring about the complete settlement of an uncompacted embankment in two or three years is usually incorrect. Artificial compaction methods must be used if settlement is to be obtained before surfacing is placed.

As the nature of soils varies widely even in small areas, the character of the material to be compacted, as well as the materials on which it is placed, must be known before the engineer can exercise proper judgment as to the best method of compaction. The major source of trouble in embankment construction has been the failure to enforce the specifications as to the thickness of the layer of loose material placed, and the method of compaction required.

Adequate compaction can be obtained with various types of rollers. General standardization of specifications for rollers which will express weights in terms of load per lineal inch is needed rather than the gross weight of roller. Other types of compaction equipment, such as wheel and track type equipment, have been successful for the compaction of embankments of certain types and in certain localities. The proper weight pressures of compaction equipment for different types of soils should be determined. The use of a power-driven mechanical device for spreading the fill material evenly in layers is highly advisable, regardless of the method of compaction. With certain types of soil, effective compaction can be obtained by the introduction of water into the soil. The use of explosives is particularly successful in displacing underlying unstable material in swamps, marshes and peat bogs, and compacting embankments in such areas.

Indemnity Bond for Cuts on Paved Streets

AN indemnity bond of $500 is required from each applicant who wishes to make a cut in the paved surface of paved city streets in Bradford. This is in addition to the permit which must be secured from the Director of Streets. City forces replace the base and surface (brick) at cost plus 10 per cent. The cost rarely exceeds $6.00 per square yard. The applicant must make the excavation entirely in open trench, no tunneling being permitted. He must mechanically tamp the backfills and use no wet or unsuitable materials. City forces widen the existing pavement 12 inches along the cut to provide a shoulder for the patch. High early strength concrete is used for the base, which permits traffic to use the street in three days as compared with the former requirement of ten days. During three years there were five failures out of one thousand openings where tunneling had been employed or against the curb where properly shouldered.

J. A. QUIRK,
Director of Streets.

Paving Costs in Kansas City, Kans.

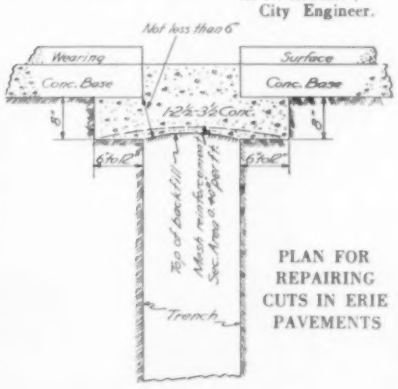
ON August 20, 1931, the city of Kansas City, Kans., awarded a contract to E. J. Wetterstrom, of Kansas City, Mo., for the construction of 3,200 square yards of 3-inch brick on 8-inch brick paving at a cost of $3.09 per square yard, and for 2,000 linear feet of curb and gutter at a cost of 40 cents per foot. The total contract price was $11,758.

HOWARD PAYNE,
City Clerk.

City Repairs Pavement Cuts in Erie, Pa.

INDIVIDUALS making cuts in city pavements are required to secure a permit from the City Engineer at a cost of $3.00, upon authorization of the City Council. Public service corporations are permitted to make cuts as needed without individual permits. All repairing is done by the city, and the costs are charged against the owner. Brick paving is sometimes replaced by the owner. The charges which the city makes for repaving these utilities cuts are $4.00 to $5.00 per square yard for brick, including the replacement of concrete base, 75 cents per square yard for asphalt pavement up to 30 inches wide, $2.75 for base 30 inches wide, and $2.25 per square yard for binder and top. Measurements for these charges are taken when the repairs are made and include any area which is cut back from the edge of the original pavement cut.

A. N. AITKIN,
City Engineer.



PLAN FOR REPAIRING CUTS IN ERIE PAVEMENTS

Note—Reinforcement to be used only when trench exceeds 30" in width

Baltimore City, Not County

BY error in the first column of this page in April, a state allotment of 20 per cent of certain revenues was stated to go to Baltimore County instead of to the city, for highways.

Five Horton Tanks *in* Spartanburg

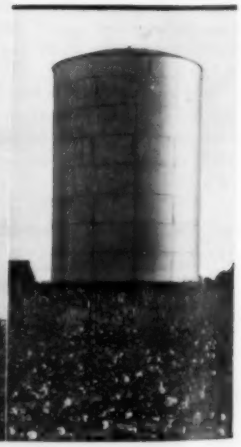
A TYPICAL example of the use of storage tanks in municipal service is afforded by Spartanburg, S. C., with a 1930 population of 28,723. A Horton standpipe was installed in 1923 and a 75,000-gallon Horton elevated wash water tank was built at the new filter plant erected in 1925. When the new sewage disposal system for the city and environs was installed in 1930-31, a 50,000-gallon Horton elevated tank was provided for water supply at each of the two plants. The waterworks department also added a 75,000-gallon Horton tank to the distribution system in 1931. This one city has Horton tanks in service for three distinct types of municipal water storage.

Horton tanks are available in all sizes for all municipal needs. Their design — particularly in the larger sizes—offers maximum storage in a small range of head—a feature which promotes operating economy. Ask our nearest office for complete information on standard sizes and designs of Horton tanks with cost estimates on any particular tank you may be considering.

CHICAGO BRIDGE & IRON WORKS

Chicago	2127 Old Colony Bldg.	Dallas	1206 Burt Bldg.
New York	3108 Hudson Terminal	San Francisco	1033 Rialto Bldg.
Cleveland	2236 Midland Bldg.	Seattle	4343 Smith Tower
Detroit	1501 Lafayette Bldg.	Houston	1101 Electric Bldg.
Philadelphia	2616, 1616 Walnut St. Bldg.	Tulsa	1425 Exchange Bank Bldg.
Boston	1501 Consolidated Gas Bldg.	Los Angeles	1303 Pac. Mutual Bldg.
Birmingham	1502 Fiftieth St., N.	Havana, Cuba	Apartado 2507

Plants at Chicago, Birmingham and Greenville, Pa.



The five Spartanburg tanks are pictured here. Above, the wash water tank. Below—left to right, two sewage disposal plant tanks, the new waterworks tank and the standpipe. Both departments are under the Water Works Commission.

Pure Water—Man's Greatest Need

Items on Water Supply and Purification

The Control of Algae with Copper Sulphate

COPPER sulphate for the control of algae can be readily added to reservoirs by placing the chemical in burlap bags, which should be dragged behind a boat over the surface of the water so that the chemical is evenly distributed as it dissolves. Experience has shown that microscopic organisms are very sensitive to copper sulphate treatment. As might be expected, the amount of this material needed to kill organisms varies with the species and type of organism. Fortunately, the majority of organisms which cause tastes and odors in water supplies can be destroyed by the use of 2.5 pounds of copper sulphate per million gallons of water treated. Experience has also shown that the dose of copper sulphate should be increased proportionately with the hardness and the organic content of the water and should be decreased somewhat with the increase in temperature. Copper sulphate is also destructive to fish, and so this chemical must be used with due regard to the fish present in the lakes, ponds or reservoirs where the treatment is to be utilized. Care should be exercised to disolve more of the copper sulphate in the deeper parts of the reservoirs, where naturally more water is treated per unit of surface area. Satisfactory results are ordinarily obtained in rowing back and forth over the reservoir in straight courses about 25 feet apart.

The destruction of micro-organisms by copper sulphate, or by natural causes, frequently produces tastes in water which are more intensive than those due to the oils liberated by the organisms before they were destroyed. Tastes so produced are of short duration, however, and are normally followed by the delivery of tasteless water for an indefinite period until re-growth occurs. It is naturally desirable to treat surface reservoirs as a routine, to prevent the undue growth of organisms rather than to wait until control measures become necessary. It is therefore frequently advisable to treat the reservoir with the suggested doses at monthly intervals during the warmer period of the year, according to "The Protection and Chlorination of Public Water Supplies," issued by the Division of Sanitation, New York State Department of Health.

Although copper sulphate is a most effective treatment for algae growths, it is one that must be applied very cautiously and carried out under very careful supervision; otherwise fish are likely to be killed, or the treatment will be ineffective. The treatment of reservoirs, ponds and lakes with copper sulphate, therefore, should be under the supervision of a competent water-supply expert, in order that the treatment may be effective and no objectionable conditions created.

The subject is covered very completely in a volume entitled, "The Microscopy of Drinking Water," by the late George Chandler Whipple and published by John Wiley and Sons, Inc., New York City. Chapter XIV of this book gives a complete résumé of the use of copper sulphate for the suppression of micro-organisms.

New Water Rates at Neodesha, Kans.

THE city of Neodesha has recently established new water rates for the improved municipal water softening and filtration works, as follows:

First	4,000 gallons,	$1.75.
Next	2,000 gallons @	35 cents per M.
Next	2,000 gallons @	25 cents per M.
Next	2,000 gallons @	20 cents per M.
Next	40,000 gallons @	18 cents per M.
Next	950,000 gallons @	12 cents per M.
Next	1,000,000 gallons @	10 cents per M.
Excess @ 8 cents per M.		

Minimum monthly bill, $1.75, to include 4,000 gallons.

F. K. VANCE,
Superintendent of Water Works, Neodesha, Kans.

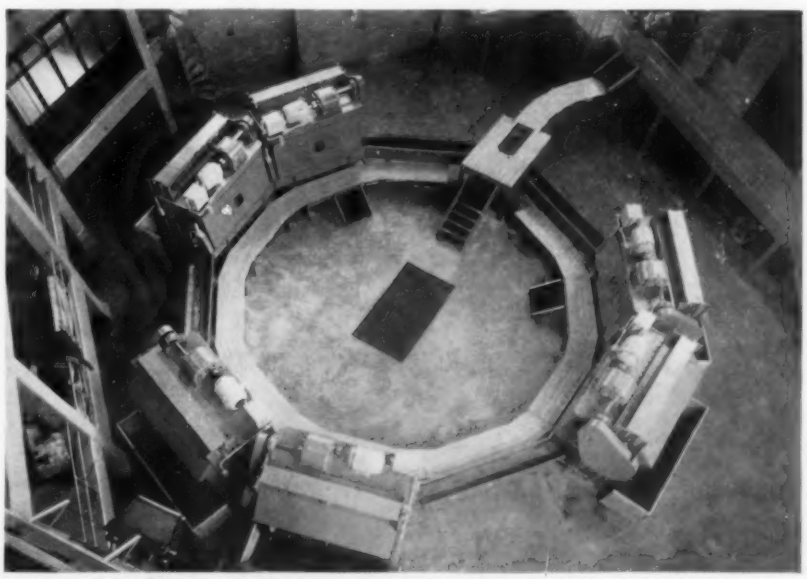
Ten Traveling Screens in a Circular Installation in Detroit

A UNIQUE water intake screen installation was recently completed for the city of Detroit in which the screens are arranged in a circular well, each one of the ten units forming the side of a polygon. Raw water from the Detroit River is admitted to a cylindrical chamber surrounding the screen circle. After passing through the screen, the water flows down through a 14-foot diameter opening in the center of the well, makes a 90-degree turn and then flows by gravity through a tunnel about 10 miles long to the new Springwells pumping station.

This arrangement reduced the cost of the screen chamber and housing and provided excellent effluent conditions to the new tunnel. The screen house was built high enough to permit removal of entire screen units by overhead cranes.

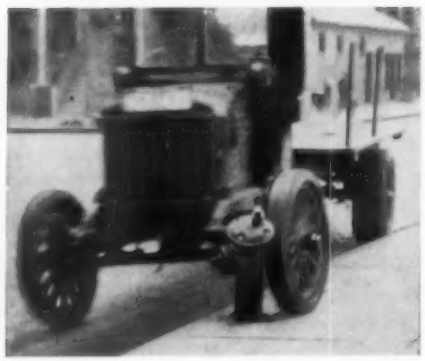
The initial installation consists of six vertical Link-Belt Clean-Water screens with 8-foot wide overlapping trays covered by No. 10 gage copper wire cloth having $\frac{3}{8}$-inch square openings. Guideways are provided for four future units, and stop logs inserted for the present. The refuse trough is located on the inside of the screen and drains in two directions to a single run-off pipe.

In an effort to prolong the life of the screens to a maximum, several new features of design were incorporated in the wearing parts. One of the most important was the use of stainless steel pins, rollers and bushings in the chains to resist the destructive effect of alternate submerged and atmospheric corrosion. The side bars are $\frac{1}{2}$-inch thick, with oil broached holes for receiving the pins and bushings.



A VIEW OF THE PRESENT INSTALLATION OF TRAVELING SCREENS FOR RAW WATER AT THE NEW INTAKE OF THE DETROIT, MICH., WATER SUPPLY

ACCIDENTS such as this



cannot be avoided But you can prepare against this—

when setting Hydrants in concrete — at only slight additional cost . . . by using

Genuine Corey Hydrants built with an Extra Flange Joint

COREY FIRE HYDRANTS, while regularly built without a joint at the pavement line, can be furnished at slight additional cost with an EXTRA FLANGE JOINT when they are to be set in CONCRETE SIDEWALKS, etc. Figure 370 illustrates this special style.

Hydrants with the ***Extra Flange*** must be set with top of lower flange ***flush*** with ***concrete.***

In case of accident, the ***Upper Standpipe*** of Hydrant will break above the Flange Joints. ***Cap Bolts*** facilitate removal of broken section, saving the enormous expense of digging up concrete, excavating and replacing of concrete.

Upper Coupling on operating rod permits repairs without disturbing internal working parts.

All replacements above concrete or pavement line are made WITHOUT SHUTTING OFF WATER IN THE MAIN.

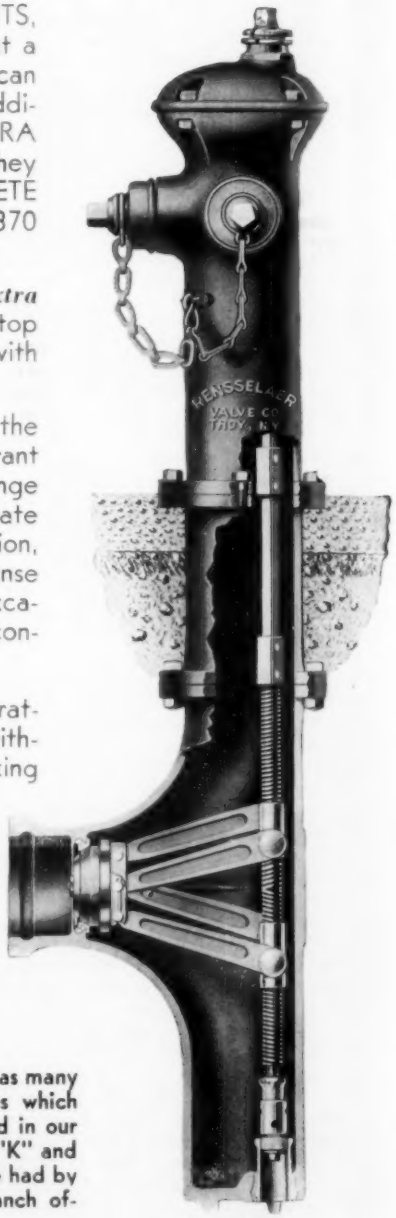


FIG. 370

The COREY HYDRANT has many other important advantages which are described and illustrated in our new Catalog "G," Bulletins "K" and "L," copies of which may be had by addressing our main or branch offices.

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Seattle, Arctic Building
San Francisco, Sharon Building
Los Angeles, Subway Terminal Building
New England, C. L. Brown, Northboro, Mass.

Why not remember to mention THE AMERICAN CITY?

Some of the Directors of the American Water Works Association

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Chief Engr., Dept. of Water Supply, Gas & Electricity, New York
Treasurer

BURTON LOWTHER
Consulting Engineer
Denver, Colo.
Director

D. F. O'BRIEN
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Gen. Mgr., Utilities Commission
Peterborough, Ont.
President

H. F. WIEDEMAN
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C. W. SMEDBERG
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Greensboro, N. C.
Director

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Sanitary Engr., State Board of Health, Helena, Mont.
Director

HARRY E. JORDAN
Indianapolis Water Co.
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Supt., City Water Co.
Chattanooga, Tenn.
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LEON A. SMITH
Supt., Water Works
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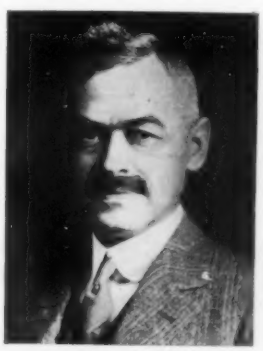
Director



W. A. KUNICK
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Tacoma, Wash.
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SAMUEL B. MORRIS
Chief Engr., Water Dept.
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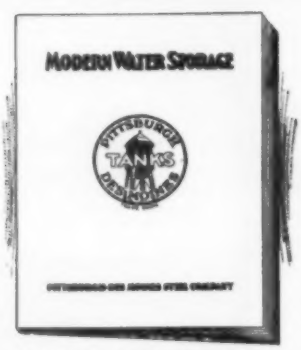
Modern Elevated Water Storage Will Improve Your Municipal Supply, Too!

You will be cordially welcomed to the "Pittsburgh-Des Moines" Booth at the A.W.W.A. Memphis Convention, May 2-6.



Ask for a copy of "Modern Water Storage," our new 28-page catalog, at our Memphis Convention Booth.

A 1,000,000-gallon "Pittsburgh-Des Moines" hemiellipsoidal bottom elevated tank erected for the City of Wauwatosa, Wis. This was a repeat order following the satisfactory performance record of a 500,000-gallon "Pittsburgh-Des Moines" elevated tank erected for Wauwatosa's municipal officials in 1927.

Adequate water pressures to outlying sections and a dependable supply to existing mains mean a clean city and a healthy community. Nothing promotes municipal cleanliness and sanitation like plenty of good, clean water.

Water stored in a "Pittsburgh-Des Moines" elevated tank gives a constant reserve that is always ready to flow under the "natural" gravity system. Demands made upon the modern city water system have marked seasonal, daily and hourly variations. An excessive investment in pumping equipment, feeder mains and treating plants is required to follow these varying demands **directly with pumps.** "Pittsburgh-Des Moines" elevated storage will smooth out the demand curve so that the other equipment need only supply water at an average daily rate. This means **minimum power costs** and very **efficient pumping schedules.**

The Fire Underwriters recognize the greater dependability of elevated water storage when they establish insurance rates.

Pittsburgh-Des Moines Steel Company

3412 Neville Island, Pittsburgh; 913 Tuttle St., Des Moines; Room 915—270 Broadway, New York

Chicago Atlanta Dallas San Francisco Seattle

Sewage Treatment Means Clean Streams

SEWERAGE and SEWAGE DISPOSAL

Permissible Limits of Stream Pollution

IN some foreign countries, notably Great Britain, we find considerably greater uniformity both in views and in laws on the question of permissible limits of stream pollution than are found in the United States, where conditions affecting stream pollution vary more widely than in many other countries.

Until recently, standards of stream pollution have been based almost wholly on requirements for preventing local nuisance. An example of such a standard is that of the British Royal Commission, specifying the maximum allowable oxygen demand of stream waters consistent with their satisfactory degree of purity; likewise, the maximum suspended matter content and oxygen demand of sewage effluent. Other examples are the various standards of minimum dilution of sewage by streams, proposed in this country from time to time, notably the dilution standard initially recommended for the Chicago Drainage Canal, which provided for a dilution ratio of 3.3 cubic feet per second per 1,000 of sewered population.

Although dilution standards of this kind are still applied quite widely in the United States, a tendency now exists toward endeavoring to base criteria of allowable stream pollution on certain minimum requirements with respect to the quality of the stream water itself, depending on the major use to which a particular stream is devoted. Where preservation of fish life is of primary importance, a minimum dissolved oxygen content of the stream water, usually about 4 p.p.m., is specified. Where prevention of nuisance is of major importance, the minimum allowable dissolved oxygen content may range from 2 to 4 p.p.m or higher, depending upon the local conditions. In streams used primarily as sources of water supply, the present tendency is toward standards of bacterial quality of the water at intakes from which raw water supplies are taken for purification. In view of the widely varying conditions met in the United States, the endeavor to fix limits of stream pollution on a basis of essential quality requirements for stream waters, rather than on minimum dilution ratios, seems to be the more logical method of approach.

Because of the very widespread use made of rivers and lakes in the United States as sources of water supply, the question of how highly polluted they may safely be allowed to become has been much discussed recently. It is also becoming a matter of increasing importance in some European countries, where the necessity of utilizing surface sources of water supply to a greater extent in the future than in the past is apparent.

On this question we find rather widely divergent views among sanitarians. At one extreme are those who would eliminate practically all direct sewage pollution of streams used as sources of water supply. At the other are those whose faith in the efficacy of modern water purification systems apparently would lead them to condone, if not advocate, the virtually unlimited pollution of our watercourses. In the middle ground are those, probably constituting a large majority, who favor prescribing well-defined limits of pollution, based on the margin of safety within which efficient water purification systems can produce effluents of acceptable palatability and bacterial quality. Such limits, as observed under conditions of actual practice, have been determined by the U. S. Public Health Service from an exhaustive study involving detailed observations of the performance of over thirty municipal water filtration plants, supplemented by operation of a fully equipped experimental filtration plant for a period of five years.

H. W. STREETER,
Sanitary Engineer, U. S. Public Health Service, Cincinnati, Ohio.

A Sludge-Drying Paradox

TO state that wet sludge will dry more rapidly than dry sludge sounds even worse than a paradox. It has the sound of nonsense, yet in a series of tests conducted by the Engineering Experiment Station of the University of Illinois it was found that moist sludge could be made to dry more rapidly by adding moisture to it. The conditions of the test simulated those conditions which are met by sludges on open drying beds in rainy weather.

The tests were conducted by preparing six drying beds each 12 inches square, all protected from rainfall and all placed together under identical conditions. Samples of sludge were taken from various tanks in the testing station and from sewage treatment plants of nearby cities. Each sample was divided into six portions, one portion of which was placed on each of the six drying beds. Every alternate day each bed was dosed with the same quantity of water, up to 1 inch of water on the most heavily dosed bed, sprinkled to simulated the action of rain. Daily observations of color, odor, general appearance, size of cracks, and depth of sludge on the beds were made, and at the end of three weeks the percentage of moisture content in the sludge on each bed was determined.

In every case, when the test was made on well-digested sludge, the beds which contained sludges with the highest percentage of moisture were those which had been moistened but moderately. The driest sludges were found on the beds which had received no moisture and on the bed which had received the greatest amount of wetting. In other words, the addition of water to some of the moist samples of sludge seemed to accelerate the drying of these moist samples. The practical significance of these tests is that a heavy rain falling on open drying beds may accelerate the drying of the sludge rather than retard it.

Such findings are apparently so far removed from probability and reason that some explanation is needed to assist belief. If a picture can be conceived of four or five particles of sludge forming an arch around a large void in the sludge, the void being filled with water, the hypothetical condition of particles in wet sludge can be imagined. If this sludge is allowed to rest undisturbed on the drying beds while evaporation occurs, it can be imagined that each of the particles grows progressively smaller owing to loss of moisture in the particles, but the arched condition of the five particles persists and the volume of the void filled with water remains relatively large compared with the volume of the five sludge particles, thus maintaining a high percentage of moisture in the entire body of the drying sludge. If water is poured upon the partially dry particles of sludge, they are lubricated and disturbed so that the particles slide over one another and the arch is broken and the void between the particles and its contained water disappears. The sludge becomes more compact and contains a smaller percentage of moisture. The explanation of this might sound far-fetched were it not for the fact that the results justified the explanation.

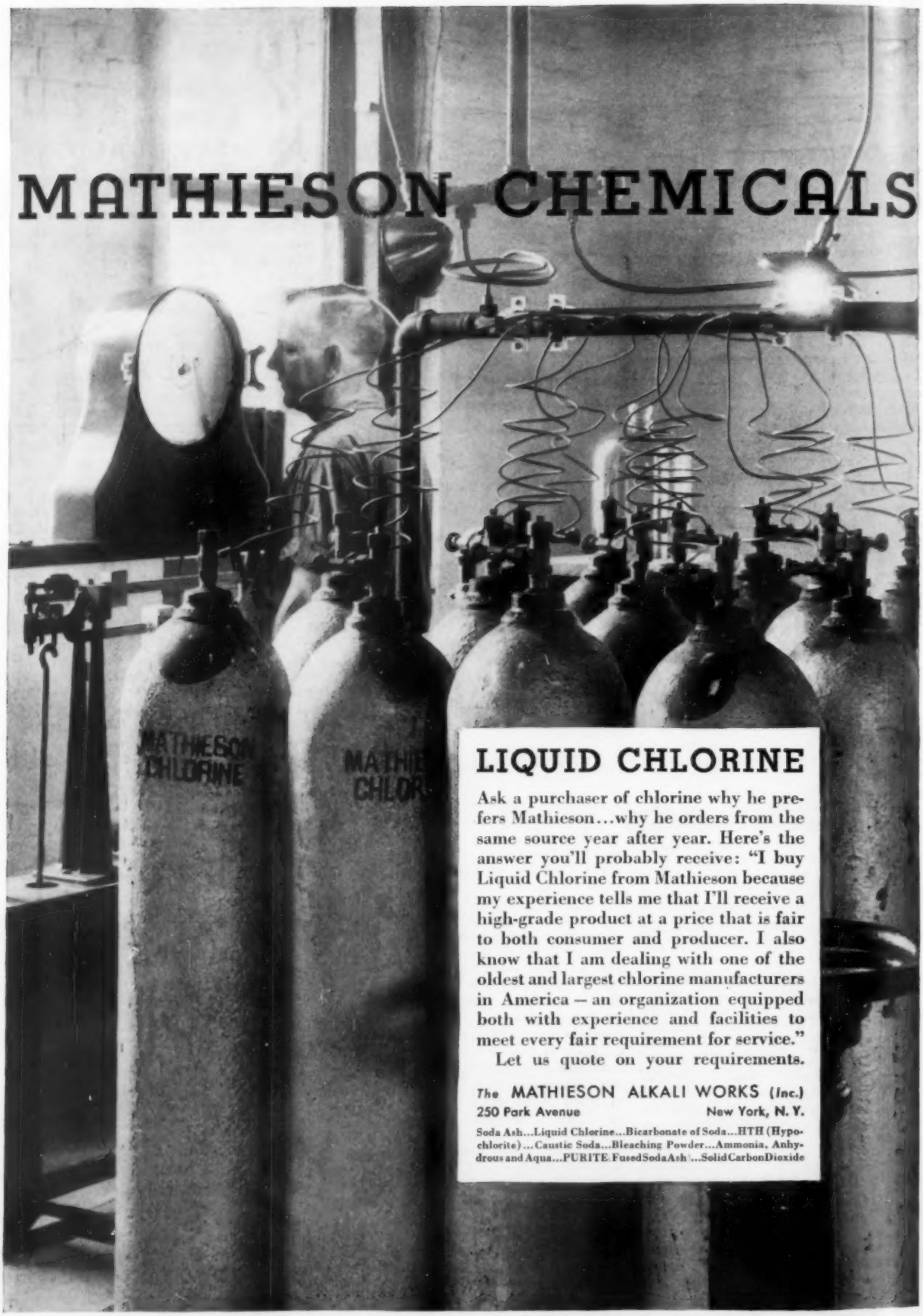
PROFESSOR HAROLD E. BABBITT,
Department of Sanitary Engineering, University of Illinois.

The Cost of Sewer Construction in La Crosse, Kans.

ON September 24, 1931, the city of La Crosse, Kans., awarded a contract for $53,497.05 to C. L. Burt, Hutchinson, Kans., for the excavation of 38,000 feet of trench in clay soil at depths from 8 to 12 feet, and for the laying of 38,000 feet of 8-, 10-, and 12-inch vitrified clay pipe. The unit cost for excavating the trench was 20 to 24 cents, which included backfilling, and for laying the sewer pipe 50 cents per foot.

JESS C. MOSER,
City Manager.

The Municipal Index for 1932 contains articles on Charges for Sewerage Service, and Sewage Disposal for the Small City.



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Ask a purchaser of chlorine why he prefers Mathieson...why he orders from the same source year after year. Here's the answer you'll probably receive: "I buy Liquid Chlorine from Mathieson because my experience tells me that I'll receive a high-grade product at a price that is fair to both consumer and producer. I also know that I am dealing with one of the oldest and largest chlorine manufacturers in America — an organization equipped both with experience and facilities to meet every fair requirement for service."

Let us quote on your requirements.

The MATHIESON ALKALI WORKS *(Inc.)*
250 Park Avenue New York, N. Y.

Soda Ash...Liquid Chlorine...Bicarbonate of Soda...HTH (Hypochlorite)...Caustic Soda...Bleaching Powder...Ammonia, Anhydrous and Aqua...PURITE Fused Soda Ash...Solid Carbon Dioxide

WILLIAM C. CATTELL
County Engr., Gloucester Co.
Woodbury, N. J.
(Appointed 1909)

ROBERT H. SIMPSON
Chief Engr., Dept. of Public Service, Columbus, Ohio
(Appointed 1920)

ALBERT L. KOTOWSKI
County Surveyor, Lincoln, Mo.
Ivanhoe, Minn.
(Appointed 1927)

NEAL C. NICKERSON
County Highway Engr., Carlton Co., Carlton, Minn.
(Appointed 1922)

E. P. EFFERTZ
County Highway Engr., Winona Co., Winona, Minn.
(Appointed 1921)

Who's Who in City & County Engineering

One of a Series of Portraits of Engineering Officials Which Has Appeared Monthly Since April, 1928

CARLETON E. RICE
City Engineer
Massillon, Ohio
(Appointed 1923)

MORTON MACARTNEY
City Engineer
Orlando, Fla.
(Appointed 1925)

L. W. GRACE
County Highway Engr., Nicollet Co., St. Peter, Minn.
(Appointed 1927)

EDWARD A. FISHER
City Engineer
Lakewood, Ohio
(Appointed 1914)

JOHN SWAN
County Highway Engr., Dakota Co., Hastings, Minn.
(Appointed 1921)

D. R. SAVAGE
County Highway Engr., Cottonwood Co., Windom, Minn.
(Appointed 1911)

H. G. ELLETSON
County Highway Engr., Benton Co., Foley, Minn.
(Appointed 1925)

JOHN H. WADSWORTH
City Engineer
Norwood, Ohio
(Appointed 1926)

W. S. HARVEY
City Engineer
Warren, Ohio
(Appointed 1921)

Water Pressure That Could Wreck a House

is

YOUR

Responsibility

What if he did hit a hydrant? Must he start a geyser that will do incredible damage, interrupt the town's fire protection, and pour out tons of water?

That's *your* responsibility, not just because of your job, but because you may some day cause an accident, and because broken hydrants can leave your property without fire protection. All danger will be avoided by specifying Mathews Modernized Hydrants.

MATHEWS
MODERNIZED
HYDRANTS
Reg. U. S. Pat. Off.

Can't Leak When Broken

Mathews Modernized Hydrants have compression valves. Water-pressure only seats them tighter, even when they are broken. Damaged barrels are replaced in a few minutes by two men without digging or repaving.

Accidents will happen, but they need not be disasters. *Write for our descriptive catalogue.*

CAST IRON PIPE—SAND SPUN (Centrifugally Cast) AND PIT CAST—GATE VALVES—VALVE BOXES
REG. U. S. PAT. OFF.

R·D·WOOD & CO. 400 CHESTNUT STREET PHILADELPHIA
ESTABLISHED IN 1803

METHODS and COSTS of REFUSE COLLECTION and DISPOSAL

Garbage Collection Costs Reduced

LARGE decreases in the cost of operation of the municipal incinerator were recorded in the annual report recently submitted to the Mayor of Norwood, Ohio. The cost per ton for garbage and ash collection during 1931 was $2.54, as compared with $3.21 in 1930. In 1931 the cost of incineration was $1.695 per ton, and in 1930 it was $1.945 per ton.

RAYMOND BARNES,
Director, Dept. of Public Service.

Three Rivers, Mich.

A contractor paid by the city collects all household garbage in Three Rivers, population 6,863, using two 1½-ton trucks. The garbage is disposed of by feeding to hogs.—O. O. JOHNSON, City Manager.

Miles City, Mont.

The municipal forces collect garbage in Miles City, population 7,175, using one 1½-ton truck with a 2-yard covered body and one 2-yard trailer. The garbage is disposed of on the municipal dump outside of city limits, where everything combustible is burned.—ROY N. STEWART, City Engineer.

Fairbury, Nebr.

The city of Fairbury, population 6,192, collects the garbage, using two 1½-yard wagons. The garbage is disposed of on a dump outside of the city.—R. B. BOALS, City Engineer.

Hastings, Nebr.

A private bonded collector paid by the householder collects the garbage in Hastings, population 15,490. The collector uses two Dodge trucks with 90-cubic-foot capacity bodies. The garbage is disposed of by feeding to hogs.—P. T. NAYLOR, City Engineer.

Laconia, N. H.

The city of Laconia, population 12,471, collects the garbage of the city, using three 1½-yard wagons and one 3-ton and one 1½-ton motor trucks. The garbage is all carried to a dump.—CHARLES A. FRENCH, City Engineer.

East Orange, N. J.

In East Orange, population 68,020, a contractor paid by the city collects the ashes and garbage with seven trucks of 7½-ton, 20-yard capacity. The garbage is disposed of by feeding to pigs and by dumping.—W. D. WILLIGEROD, City Engineer.

New Brunswick, N. J.

The city of New Brunswick, population 34,555, uses five 11-yard wagons and one 5-yard motor truck for the collection of garbage in the city. The garbage is disposed of at the municipal incinerating plant.—JOHN J. CURRAN, Superintendent of Streets.

Paulsboro, N. J.

One contractor paid by the city and several independent collectors pick up the garbage throughout the borough of Paulsboro. The city contractor uses a 1½-ton truck, and the garbage is disposed of by feeding to hogs. The contractor is paid $50 per month, or $600 per year.—JAMES A. WERT, Mayor.

Trenton, N. J.

The city of Trenton, population 123,356, uses nineteen wagons of 2-ton capacity and ten 3½-ton and two 2-ton motor trucks for the collection of garbage, which is disposed of by burning in the 8-furnace municipal incinerators.

Wallington, N. J.

The city of Wallington, population 9,063, uses one 3-yard wagon for the collection of garbage, which is taken to a dump and covered.—EDWARD VANDERVLIET, Superintendent of Public Works.

Binghamton, N. Y.

The city of Binghamton, population 76,662, collects the garbage with trucks, a tractor and trailers. There are fourteen 3½-yard trailers in service and one tractor and nine 5-ton trucks. The garbage is disposed of by feeding to hogs and by burial of remainder.—FRANK T. RAUGHT, Superintendent, Ash and Garbage Department.

Fulton, N. Y.

A contractor paid by the city and using one 4-yard motor truck collects the garbage throughout the city of Fulton, population 12,462. The garbage is disposed of by burial.—H. S. ANDREWS, Superintendent of Streets.

Hornell, N. Y.

A contractor who is paid by the householders collects the garbage in Hornell, population 16,250, using a motor truck with an 18 x 8-foot body and a trailer with a body of similar size. The garbage is disposed of by hauling to a point outside of the city and dumped.—ROBERT W. WEIR, Sanitary Inspector.

Ithaca, N. Y.

The city of Ithaca, population 20,708, with addition of about 6,000 student population for 10 months, collects the garbage with seven 3-cubic yard motor trucks and disposes of it by dumping on low ground.—FRANK FELLER, Superintendent of Public Works.

Johnson City, N. Y.

The city of Johnson City, population 13,567, takes bids for the collection of garbage. The present contractor uses one 5-ton, 4-yard truck and one 1½-ton, 2-yard truck for collection. The garbage is disposed of by burial.—J. C. ADAMS, Supt. of Public Works.

North Tonawanda, N. Y.

In North Tonawanda, population 19,019, a contractor paid by the city collects all of the garbage and rubbish, using one 2-ton and one 3-ton truck. The garbage and rubbish is disposed of by burning in a Nye circular type incinerator.—CARL L. OELKERS, City Engineer.

Saranac Lake, N. Y.

In Saranac Lake, population 8,020, garbage is collected by municipally owned trucks. Two 1½-ton trucks with 3-yard garbage dump bodies have been found satisfactory for this purpose. The garbage is disposed of by an incinerator.—W. E. TIMMERMAN, Village Manager.

Utica, N. Y.

In Utica, N. Y., population 101,740, a contractor paid by the city collects all of the garbage, using ten teams and trailers and six motor trucks. Recently, five new International trucks with Collecto bodies have been added. The garbage is disposed of by incineration.—CHARLES MCKERNAN, Commissioner of Public Works.

Watertown, N. Y.

The garbage of Watertown, population 32,205, is collected by a contractor, who is paid by the city. The contractor uses one 3-yard and two 4-yard wagons and two 5-yard sleighs for collection. The garbage is disposed of outside the corporate limits by feeding to swine.—H. B. EVANS, Purchasing Agent.

Durham, N. C.

The city of Durham, population 52,037, collects the garbage with municipal equipment, using two 2-yard wagons, five 4-yard motor trucks and three 4-yard trailers. The garbage is disposed of in four municipally owned incinerators.—H. W. KUEFFNER, Director of Public Works.

7586 SPRINKLER HEADS IN WORLD'S LARGEST SUGAR REFINERY

supervised by 7 GAMEWELL "SPRINKLER WATCHMEN"*

* A SPRINKLER WATCHMAN is simply a Gamewell municipal fire alarm box hooked up on one hand to the municipal fire alarm system and on the other hand to your sprinkler system.

The operation of a sprinkler head trips the SPRINKLER WATCHMAN, shown above, and the latter sends in an alarm to the fire department —all in a few seconds.

On the west coast 7 Gamewell "SPRINKLER WATCHMEN" keep constant watch over 7,586 sprinkler heads in the huge plant and warehouses of the California & Hawaiian Sugar Refining Corp., Ltd., at Crockett, Calif. —the largest sugar refinery in the world, with an annual capacity of more than 750,000 tons.

Should a sprinkler head go off for a fire anywhere in this property, the plant fire brigade and the municipal fire department would know about it instantly, through one of our SPRINKLER WATCHMEN. Thus, the firemen have a chance to reach each fire while it is still small—to extinguish the fire if the sprinklers have not already done so, or to shut off the water and prevent unnecessary water damage if the fire has already been put out.

The SPRINKLER WATCHMAN costs little, involves no rental or maintenance charges, and has a life of 30 to 40 years. Write for our Bulletin I. L. 302.

Recommend This Protection to the Sprinklered Risks in Your City

Every progressive fire chief and superintendent of fire alarm is recommending this form of sprinkler supervision to the sprinklered factories, warehouses, schools, hospitals, institutions, theatres, etc., in his city. Such protection safeguards your large fire hazards and panic spots, by making every sprinkler head a fire department nerve.

THE GAMEWELL COMPANY
NEWTON, MASSACHUSETTS

Police—Fire—Safety Items

of Interest to Departments of Public Safety

Fire Waste Contest Shows Encouraging Results

THE 344 cities taking part in the National Inter-Chamber Fire Waste Contest, awards in which will be made at the annual meeting of the Chamber of Commerce of the United States this month, were greater in number and showed a lower average per capita fire loss than any of the previous contests. These began in 1923, and are sponsored jointly by the National Fire Waste Council and the national chamber of commerce.

The list of winners follows:

Class I cities, more than 500,000 population, Milwaukee, Wis.
Class II, 250,000 to 500,000, Portland, Ore.
Class III, 100,000 to 250,000 Youngstown, Ohio
Class IV, 50,000 to 100,000, Lakewood, Ohio
Class V, 20,000 to 50,000, Owensboro, Ky.
Class VI, under 20,000, Corvallis, Ore.

Owensboro will receive the grand award as making the greatest progress in checking fire waste of any of the 344 cities in the contest. Awards will also be presented to each of the other winners in the population groups.

The per capita fire loss last year in the competing cities was $2.33, and represents a saving to the 28,000,000 inhabitants of these cities of $15,000,000 under the 1930 figures. Their total loss last year was $66,399,000, as against an average of $82,264,000 in the five-year period ending with 1930.

The greatest reduction in fire waste was shown among cities of over 500,000 population, the decrease aggregating 27.1 per cent. The smallest reduction was shown among cities between 100,000 and 250,000 population where it was 5.2 per cent.

Although fire losses declined, the number of fires increased slightly, by 1.2 per cent. In the largest cities, which had achieved the greatest reduction in fire destruction, there was an increase of 6.5 per cent in the number of fires. The very difficult task of reducing the number of actual fires, despite increase in population and the number of burnable units, was, however, accomplished by 59 per cent of the cities in the contest. The best record in this respect achieved heretofore was in 1927 when 41 per cent of the cities showed reductions.

Serious fire constitute only a small proportion of the total as to number, but are responsible for a majority of the annual fire waste. Reduction in number of fires of this type is therefore very important. In 1931 this was accomplished by 57 per cent of the participants; and fires in which the loss exceeded $1,000 showed a decrease of 5.4 per cent in the contest cities. This accomplishment reflects the progress in fire control achieved as a result of improved fire departments, more adequate legislation and general increase in community interest.

A number of cities received honorable mention. They are listed below in the order of their rating:

Class 1: Philadelphia, Detroit, Pittsburgh, St. Louis, and Chicago.

Class 2: New Orleans, Indianapolis, Cincinnati, Rochester, Akron, Washington, D. C., St. Paul, Kansas City, Mo., Denver, and Memphis.

Class 3: Hartford, Conn., Dayton, Ohio, Grand Rapids, Mich., New Bedford, Mass., Wichita, Kans., Long Beach, Calif., Ft. Wayne, Ind., Peoria, Ill., Wilmington, Del.; and Honolulu, Hawaii.

Class 4: Fresno, Calif., Allentown, Pa., Hammond, Ind., E. Orange, N. J., Evanston, Ill., Topeka, Kans., Asheville, N. C., Pasadena, Calif., Hamilton, Ohio, and Lansing, Mich.

Class 5: Elyria, Ohio, Mishawaka, Ind., Watertown, N. Y., Portsmouth, Ohio, Santa Ana, Calif., Zanesville, Ohio, Newburgh, N. Y., Lubbock, Texas, Mason City, Iowa, and Amsterdam, N. Y.

Class 6: Fremont, Mich., Albany, Ga., Woodward, Okla., Marshfield, Ore., Glasgow, Ky., Pottstown, Pa., Marietta, Ohio, Athens, Ga., Coatesville, Pa., and Valley City,, N. D.

N. F. P. A. Committee Recommends Changes in Garage Regulations

IN recognition both of the great need of off-the-street facilities for parking automobiles and of changed conditions as regards fire hazards, the Committee on garages, of the National Fire Protection Association, recommends that garages be permitted, under adequate safeguards, in or near buildings where large numbers of automobile users assemble. The committee's report on "Recommended Good Practice Requirements for the Construction and Protection of Garages" will be presented on May 12 before the N. F. P. A. convention at Atlantic City. (See also page 129.)

Proceeding on the conviction that under present traffic conditions cars should be parked elsewhere than on the streets, the report says:

"To bring about the desired results, the average city must change its legislation regarding storage of automobiles. Such restrictions as prohibiting a garage within 500 feet of a school, church or other place of assembly must be removed if parking on the streets is to be ruled out and the use of the streets confined to traffic. Since the date when the present restrictive laws and ordinances had their inception there have been improvements in design and construction of the internal combustion engine and material reduction in the volatility of the gasoline used for fuel. As a result of the widespread service-station facilities of the oil industry there is little storage and handling of gasoline in the present-day garage. Vulcanizing is rarely found in garages and this and other hazards such as carbon and lead burning, etc., can be suitably guarded.

"The accompanying good practice requirements are a step towards the solution of this problem. They are intended to aid in a constructive manner the proper regulation of traffic conditions in American cities and thus contribute to the conservation of life and property. This is brought about through a liberalizing of garage regulations, which will permit the inclusion of a garage section in connection with any class of occupancy, whether mercantile, residential, office, school, theater or church; but with this must come proper construction details for the building, adequate protection and good maintenance."

Although other safety considerations—such as the danger to pedestrians from large numbers of cars crossing sidewalks—enter into the question of garage location, the great importance of fire protection makes the attitude of this committee very significant.

Development of Police Radio Calls for Wider Frequency Range

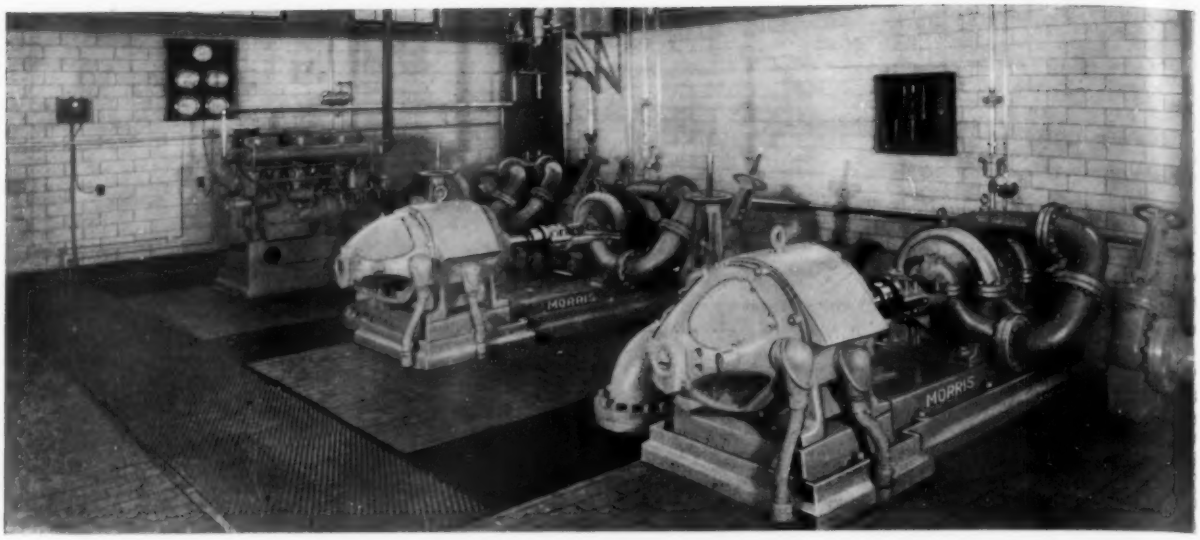
THE Federal Radio Commission may take from television some of its frequency allocations and give them to police service in the not-far-distant future, according to *The United States Daily*, for April 9.

Anticipating the time when police radio service will play a major part in crime detection in every thickly populated section of the United States, it was explained, the Commission is preparing to meet the situation with additional frequencies for police use. If the service keeps growing as it has in the last years, it was declared, it is "very likely" these adidtional frequencies will be needed within the next three or four years.

There are now about 70 police broadcasting stations in operation, and at the present rate of growth, this number will exceeded 100 by next year.

The annual convention of the International Association of Chiefs of Police, at St. Petersburg, Fla., in October, 1931, adopted a resolution asking the Commission for more frequencies for police service. Since the convention the Commission has given the service one more channel, feeling there is no need for more at this time.

The Commission, however, realizes that with growth of the system, there is bound to be a need for more frequencies. And at present it seems highly probable these frequencies will be taken from the television band. Experiments in the visual broadcasting field now indicate that the ultra-high frequencies will be best suited to transmission of images.



Interior view of water-works pumping station at City of Concord, N. H. Metcalf & Eddy, Consulting Engineers; P. R. Sanders, Supt.; Starkweather & Broadhurst, Contractors.

1800 *Communities*

should be interested in this municipal pumping plant

EACH of the 1800 medium-sized communities in the country can find much of direct application to their own water-works systems in the general design and equipment of the new pumping station at Concord, New Hampshire.

The automatic priming system, the special filter and suction tank, the provision of independent standby unit for emergency service, the highly efficient equipment, and the masterly layout of the complete plan combine to make this one of the finest medium-sized pumping stations in the country.

The heart of the plant—its pumps—are all Morris Centrifugals. There are two Morris Motor-driven Pumping Sets, each consisting of two six-inch double suction horizontally split pumps operating in series and driven by slip ring electric motor. Each of these units has a capacity of 1000 g.p.m. against 310 ft. total head. A third pumping unit, intended for standby service, consists of three Morris Pumps arranged in series for gas engine drive. On tests of the plant, supervised by the City's Consulting Engineer, all of the pumps exceeded the required duty and showed particularly high efficiencies.

Many other municipal "show" plants, both for water supply and sewage disposal and for large and small capacities, are also Morris-equipped. Engineers and superintendents responsible for the successful operation of pumping stations in every section of the country have found from the experience of their own or neighboring communities that Morris Pumps are skillfully designed, sturdily built and conservatively rated. If you are contemplating construction of a new plant or additions or replacements at existing ones, be sure to consider Morris Centrifugal Pumps.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

MORRIS
CENTRIFUGAL PUMPS

MAY, 1932

Vol XLVI, No. 5

The American City

470 Fourth Avenue
New York

50 Cents, $4 a Year

Memphis Improves Its Ground Water Supply

By F. G. CUNNINGHAM
Fuller & McClintock,
Engineers, New York City

THE entire water supply of Memphis is taken from wells. The wells penetrate two strata of sand, the upper stratum being 300 to 500 feet below the surface, and the lower stratum roughly 1,000 feet deeper. The upper stratum, known as the Lagrange formation, is the more important and furnishes most of the supply. It is the one commonly used in this vicinity.

The lower stratum has been developed by the city to a limited extent, because wells in it do not interfere with those in the upper stratum, and, therefore, wells in the respective strata can be placed in close proximity to each other, and a greater capacity obtained from a given area. The Lagrange formation underlies western Tennessee, eastern Arkansas and northern Mississippi. It outcrops in a belt roughly parallel with the Mississippi River and some 40 miles eastward therefrom. Throughout this entire region it furnishes an ample supply to many municipalities and industries. The outcrop area is such that an abundant supply is in sight, for everyone caring to use it, for many years to come. The sands and clays, which are interspersed, are supposed to be deposits formed in prehistoric times, when the entire Mississippi Valley as far north as Cairo was practically an arm of the Gulf of Mexico.

The water in wells penetrating the Lagrange stratum in Memphis rises to a height of 50 to 100 feet below the ground surface, depending upon the ground elevation. The water plane has a slope of about 6 feet per mile, rising to the east and probably becoming flatter somewhere east of Memphis. The general water level in Memphis varies somewhat with the rate of pumpage from the region as a whole. Since the early well developments some forty years ago, the gradually increasing quantities of water taken from the Memphis region have set up a steeper hydraulic slope from the outcrop areas to Memphis, so that now the water levels are perhaps 30 feet lower than originally. There is nothing in the evidence, however, to indicate that the recession of water level from this cause will be a matter of concern for many years, for it is easily practicable to pump the water from greater than the present depths.

The vertical thickness of the Lagrange stratum at Mem-

THE PARKWAY STATION, SHOWING THE PUMPING STATION, THE IRON REMOVAL PLANT AT THE LEFT AND ONE OF THE WELL HOUSES IN THE RIGHT FOREGROUND

phis is from 50 to 150 feet. The sand is quite variable in fineness, and requires the use of a strainer with narrow slots. In general, however, satisfactory wells can be secured in any part of the city.

In 1930 the population of Memphis was approximately 254,000, and the water consumption averaged about 19 million gallons daily. The average per capita consumption was therefore about 75 gallons daily. This rather low per capita rate is partly due to the presence of numerous industries and hotels which have their own private supplies and whose total consumption may approach that of the city water works. The maximum 24-hour demand from the municipal water system has been about 27 million gallons, and this occurred during the drought of 1930. The variations in hourly consumption are met principally by storage basins adjacent to the supply works.

Characteristics of the Water

The water in the Lagrange stratum is characteristically high in carbon dioxide, the quantity of which ranges from 100 to 130 parts per million, and the water also contains about one part per million of iron, as a general average. In some cases the iron content seems to increase with the age of the wells. Both the corrosive action of the carbon dioxide upon the iron of the piping system and the iron naturally present in the water made the supply generally unsatisfactory until the present works, which include purification, were built in 1922-24. Prior to that time red-water stained bathtubs and stained clothing washed in home laundries were common nuisances. Since then the purification works described below have been completely successful in overcoming these difficulties.

The water from the Lagrange stratum is quite soft in comparison with the Mississippi River and other locally available surface waters. What hardness there is, in the form of so-called temporary hardness, produces a soft rather than a hard scale. A characteristic of the water is the sodium bicarbonate content. The water from the lower stratum is much higher in mineral salts, notably sodium salts, and not so satisfactory for steam-making purposes as the Lagrange water.

Abandoned Supply Works

Prior to 1924 when the present water works was placed in service, the city depended upon three distinct groups of supply works. One of these consisted of fourteen scattered independent wells, each equipped with an electrically driven centrifugal pump delivering the water directly into the mains. Another group, constructed originally to serve as a temporary expedient, had a capacity of four million gallons daily. At this inefficient and crude steam plant the water was pumped in two stages, by means of air lift and reciprocating pumps. The third group, which was the original and for many years the sole source of supply, was the so-called Auction Avenue station. The interesting feature of this group was the method employed to collect and pump the water. A large number of wells were driven from the surface in the ordinary way. The water from these wells was brought to the central pumping station through tunnels located in a blanket of clay about 80 feet below the ground surface. The water flowed by gravity through this tunnel system to the pumping station, where it was within suction reach of vertical reciprocating pumps set in a deep masonry pit. Considering the precedents available at the time, the construction of this tunnel system was bold and the connections to the wells involved the application of ingenious expedients.

At the time the present works were designed and built, in 1922-24, additional capacity was needed and was not practicably obtainable except through building a new plant. It was decided, based upon cost analyses made then, that economy would require making this new plant large enough to serve the entire city and scrapping all the former facilities. Thus the city went through the rather unusual experience of abandoning at one stroke everything it possessed in the way of wells, collecting works and pumping stations.

Present Supply Works

The present supply is obtained from a chain of wells about two miles long, the westerly end of which terminates at the pumping station and purification works, which are located about two miles northeast of the business center of the city and are known as the Parkway station. There are 31 wells, 9 of which penetrate the lower stratum. Water is raised to the ground surface by air lift and flows by gravity to the pumping station. At that point it is raised approximately 25 feet by secondary pumps and is passed first through aerators to eliminate the carbon dioxide and next through ordinary rapid sand filters to remove the iron. The aeration of the water not only removes the carbon dioxide but oxidizes the dissolved iron and converts it into tiny flocculent particles which can be caught on the surface of the filters but which would not settle in a reservoir or basin.

After being filtered, the water passes to the pumping station and is pumped into the mains. The pumping station is operated by steam and employs relatively high pressure and superheat. The air-compressors are of the cross-compound reciprocating type. Two of the pumping units are reciprocating cross-compound engines and three are steam turbine centrifugal units, each of the five having a capacity of 15 million gallons daily.

The decision to use air lift instead of electrically driven turbine type pumps for raising the water from the wells was based upon economic studies which indicated a moderate advantage for the air lift. Aside from this, it was preferred by reason of its simplicity and flexibility, and because the air lift removed about 80 per cent of the carbon dioxide, thus simplifying the subsequent aeration. The operating experience in the past seven years has been satisfactory, and the fuel consumption has been less than originally estimated. The principal factors which permit the advantageous use of air lift in this case are the large size of the installation and the centralizing of all the pumping facilities into one plant. Owing to these conditions, air can be compressed and utilized at costs that could not be approached with small or scattered installations. Also, by systematic planning and operating of the air lift system, the average operating efficiency of the air lift as a pumping device has been kept at a higher level than is commonly the case at small and frequently neglected plants.

The cost of the Parkway project was approximately $2,800,000.

New Supply Works

There is now under construction another set of supply works known as the Sheahan station, located near the State Normal School, about 7 miles east of the business center.

THE SYMMETRICAL GROUPING OF BUILDINGS AT THE SHEAHAN STATION, AS SHOWN BY THE ARCHITECT'S DRAWING

The ultimate capacity of this station will be 30 million gallons daily, or slightly more than that of the Parkway station. The present equipment will have a capacity of 15 million gallons daily, but the principal structures and pipe lines are being built now for the ultimate capacity.

The new works in conjunction with the Parkway station should be ample for the city's needs during the next 20 to 25 years. They comprise the same principal elements as the Parkway development, namely wells, collecting pipes, aerator, iron-removal filters, clear-water storage reservoirs, and pumping station. The wells supplying the Sheahan station will also be pumped by air lift, and the pumping station will be operated by steam, as in the Parkway project.

The construction of this station was anticipated when the Parkway station was built in 1922-24. The growth of the city is practically all to the eastward, and the program which was then formed and which is being carried out is that the Parkway station shall be depended upon to serve the older or westerly portion of the city, and the Sheahan station shall serve the now thinly improved but rapidly growing easterly section. The distribution system also affords the opportunity for considerable interchange of territory served by the respective stations. It would have been possible to make the Parkway station large enough to serve the entire city indefinitely. Economic studies showed, however, that it would be cheaper to build the second station than to carry out the necessary progressive increase in supply mains leading eastward. Also, two stations give advantages in reliability and in securing a decreased pumping lift, by dividing the supply field into two widely separated areas.

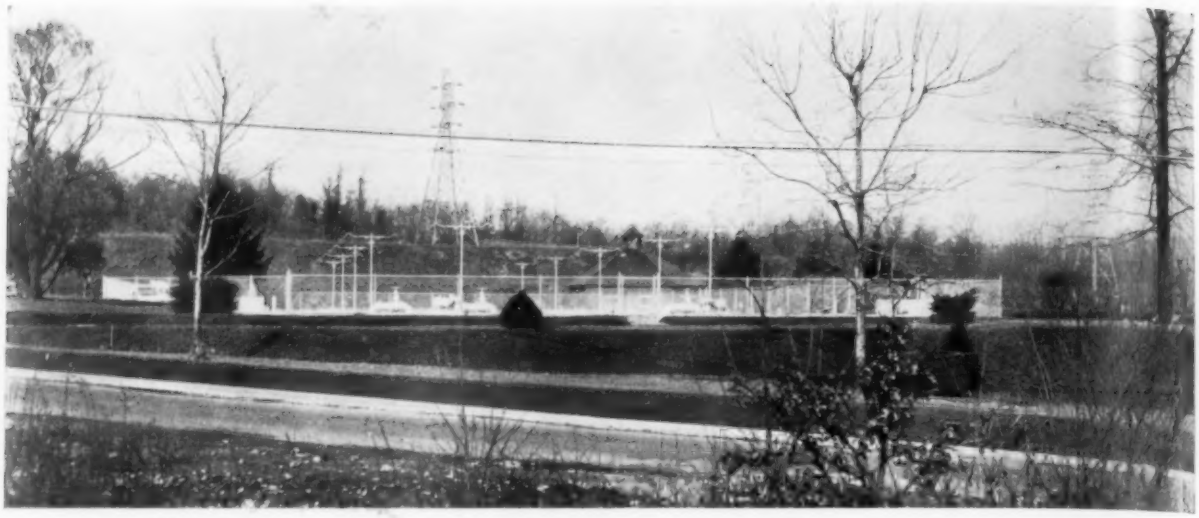
With plenty of land available, it has proved possible at the Sheahan station to secure a symmetrical grouping of buildings that should be pleasing in appearance as well as convenient and satisfactory in engineering arrangements. The appearance of the main face of the group is shown upon the reproduction of the architect's perspective drawing. On the left will be the filter plant, in the center the pumping station, and at the right the aerator. As regards the outside appearance and dimensions of the principal faces, the left-hand and right-hand buildings will be symmetrical and identical. The entrances of these two buildings are opposite each other, and they and the main entrance to the pumping station face upon a common center shown in the foreground. The filter plant and the aerator each rest, practically speaking, upon the roof of a 10-million-gallon filtered water reservoir, the earth cover of which merges in with the grade around the main entrance of the building.

The aeration in this case, as in the Parkway station, will be accomplished by allowing the water to trickle down through a series of trays filled with coke, the trays being placed one below the other. The tray design in the new station includes improvements to prevent a more or less objectionable spattering of the water which occurs in the Parkway aerator.

The filter plant is designed so that it may be operated practically automatically. No chemical treatment is required, and automatic devices will prevent the water level in the filters from getting too high or too low. Aside from occasional checking-up visits by one of the pumping station employees during the day, and the routine of washing filters on an average once in four or five days, there will be little operating attendance required.

Personnel

The Sheahan station was designed and is being constructed under the supervision of Fuller & McClintock, who were also engineers for the Parkway station. Thomas H. Allen, of Memphis, is acting with them as associate required, and automatic devices will prevent the water in both projects were dealt with by the firm of Jones, Furbringer & Jones, of Memphis. The principal contractors are Jerome A. Utley, of Detroit, for grading and substructures; the S. & W. Construction Co., of Memphis, for superstructures; the Babcock & Wilcox Co., for boilers; Burford, Hall & Smith, of Atlanta, representing the DeLaval Steam Turbine Co., for pumping units; and the Worthington Pump & Machinery Corporation, for air-compressors and electric generators. The cost of the project will approximate $1,750,000, the contract price levels being decidedly below the 1922 Parkway prices.



THE MORRISTOWN, N. J., SEWAGE TREATMENT WORKS, SHOWING AERATION AND FINAL SETTLING TANKS AT LEFT

Notable Planning Characterizes Morristown's

Single Building Housing Pumps, Blowers and Other Equipment Appears as One-Story Structure in Colonial Design

MORRISTOWN, N. J., is one of the oldest towns in the state and is rich in historic interest. A suburban community with many large and beautiful estates, the town has always preserved its residential character. A water-supply system was installed in 1803 by a private company. The town purchased the system in 1923 and has since modernized it and developed new sources of supply adequate for many years to come.

Older Plant Overloaded

Sewers were not installed until 1909 and the original plant was placed in service in 1910. This plant, designed by Clyde Potts, C.E., had a design capacity of one million gallons per day and included four settling tanks and five contact beds, each of triangular shape, forming a pentagon, with automatic controlling apparatus in the center. Each contact bed discharged to a separate sand filter. Chlorination was later added to the treatment. This plant for many years furnished an effluent of high quality, and with the exception of the construction of some additional sand filters, functioned for a period of twenty years without change. During the last few years the overload on the plant made the obtaining of an effluent of the desired quality increasingly difficult. Therefore, the Sewer Committee in 1929 recommended enlarging the plant with units of the activated sludge type and additional sludge digestion tanks. Construction was started late in 1930 and substantially completed in November, 1931.

New and Old Plants Operate as a Unit

In laying out the new units, the original plant was left intact with the exception of one of the contact beds, which was partially removed to permit the construction of the aeration tanks. The original settling tanks are kept in service. Three of the units are used for reserve sludge digestion tanks, with suppressed roofs. The fourth unit is used for preliminary settling and is equipped with a Hardinge crane-type apparatus for the mechanical removal of settleable and floating solids. A crane traveling on rails on the longitudinal tank walls carries a scraper on the tank bottom and another at the water surface. When the apparatus approaches the sludge hopper and scum trough at the inlet end of the tank, the scrapers are held in a vertical position, and the solids are pushed toward the end where they are collected. An ingenious device flushes the scum into the scum trough. The apparatus is automatically reversed and the scrapers are raised to a horizontal position for the return trip. Collected solids are removed to digestion tanks.

Settled sewage flows to the new aeration tanks. The new construction includes aeration and final settling tanks, sludge digestion tanks, blower house and chlorine detention tanks. After clarification in the final settling tanks, the effluent is filtered through existing sand filters, is chlorinated and discharged into the Whippany River.

Aeration Tanks

The aeration tanks are designed along the lines of plants at Mineola, N. Y., Rockville Center, N. Y., and Madison-Chatham, N. J. The tanks have 10 feet water depth. Three

AND BLOWER HOUSE AT RIGHT, WITH FOUNTAIN FOR TREATED SEWAGE IN FRONT

Sewage Treatment Works

By WESTON GAVETT
Assoc. M. Am. Soc. C.E.
Sanitary and Hydraulic Engineer,
Plainfield, N. J.

units are 10 feet wide, and two are 15 feet, 7½ inches wide. Cross-baffles 13 feet 2 inches center to center reduce short-circuiting and may be used to support paddle shafts. Holes were provided in the baffles in the three 10 feet wide tanks for this purpose. A spiral flow is induced by air perforated pipe diffusors placed at one side of the tanks. The tanks are arranged for great flexibility in operation and may be used in series, in parallel, or with one or more units used for sludge-aeration. The new units provide for a flow of 2 million gallons per day. A capacity of 3 million gallons per day was originally considered, but it was felt that the rate of growth of the town did not justify construction for more than 2 million gallons per day at present. It was found possible to lengthen the aeration tanks somewhat at little cost, giving these units 6½ hours detention with 20 per cent return. Two final settling tanks of vertical flow type and a two-hour detention period follow the aeration tanks. The sludge removal apparatus is of the spiral type and the sludge is raised by an air lift and returned to the inlet to the aeration tanks. Excess sludge is wasted to the digestion tanks, where it is digested with the sludge from the preliminary tanks.

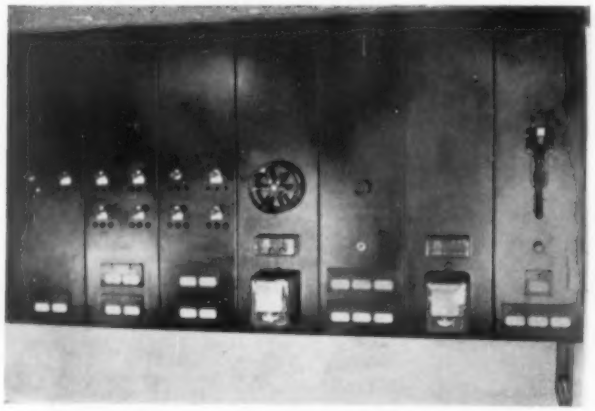
Sludge Digestion

The sludge digestion tanks are in four units with a total capacity of 40,000 cubic feet, or 2 cubic feet per capita. The reserve digestion tanks provide additional storage of 35,000 cubic feet. Heating coils are installed in the four new sludge digestion tanks with additional coils in one unit for 120° digestion. The hot water circulation system is connected to coal and gas water heaters, the water-jacket of the gas engine and the water-jackets on the exhaust pipe from the engine. Water is kept in circulation by a centrifugal pump. Gas is collected and carried through traps to a 2,000-cubic-foot gas holder and then to gas meter, trap, gas water heater, gas engine and laboratory.

Design of Blower House

Much study was given to the design of the blower house, with convenience of operation the objective. The new sludge digestion tanks adjoin the rear of the blower house, and the final settling tanks are close by. The front elevation and side elevation from the entrance show a one-story building. The road bends around the digestion tanks with down grade to the other side of the building, giving access to the floor below. A still lower floor under part of the building contains the sludge pumps, piping and valves. On the main floor the front wing houses the blowers, gas-engine-driven generator and switchboard. The office and laboratory are in the back wing, separated by double doors, so that the machinery noise is not objectionable in these rooms. The office and laboratory are convenient to the aeration tanks and sludge tanks—a saving in steps appreciated by the operators. On the lower floor are the air filters, transformers, heating system for building and sludge tanks, sewage effluent meter, sludge pump motors, lime feed apparatus and shop. This floor is at the lower ground level, and lime and other materials may be brought in unseen from the main road and entrance to the plant. The sludge pumps and piping are located on the floor below.

Air is supplied by three 1,000 c.f.m. Needham positive pressure type blowers each direct-connected to 30-h.p.



THE SWITCHBOARD AT THE MORRISTOWN SEWAGE TREATMENT WORKS

motors. One of the blowers is connected to a variable speed motor.

A gas-engine-driven generator provides standby service and a means of reducing operating cost. A 90-kva. generator is driven at 900 r.p.m. by an 8-cylinder, 170-hp. Buffalo gas engine. The engine is equipped for gasoline or gas fuel. The plant may be operated on the generator and completely shut off the power company's lines. An attractive switchboard, designed and constructed by the Superintendent of Sewers, simplifies operation. The board is of dead front type, constructed of black steel panels with flush meters and remote control starters. A turn of the pilot switch to the left starts the motor on outside power. Turned to the right, the motor is started on the generator. Three pilot lights for each motor show at a glance the operating condition. Green indicates motor operating on outside power; amber, on power from generator; and red, operating conditions abnormal. All control equipment is mounted in an enclosed space in back of the board, entered only through a wire screen door with lock.

While convenience and utility determined the blower house layout, it was realized that this building is the most prominent feature of the works. It was felt that in a town personally selected by Washington for a cantonment for 12,000 Continental soldiers in 1779, where his headquarters and camp grounds are patriotically preserved, the building should be of appropriate Colonial type. The historic atmosphere was well developed by the architect, Frank Cregar, of Morristown.

Day Labor and Contract Construction

An outstanding feature of the construction was the performance of part of the work by town employees and part by contract, a procedure which considerably reduced the cost. That construction with this division of labor proceeded smoothly and satisfactorily was due to the interest and hard work of the Sewer Committee, and the teamwork of competent department heads, supported by the confidence and cooperation of the Mayor and Board of Aldermen.

Personnel

The contract for excavation, concrete and large piping was awarded to the Gray Construction Co., of Morristown. Much of the equipment was purchased on separate contracts. Small piping, the switchboard, electrical work and much of the equipment was installed by town employees under the direction of Floyd A. Hoffman, Superintendent of Sewers. Frederick H. Guerin was resident engineer in charge of construction, and the writer was designing engineer.

Emergency Employment on Golf Courses

By **ROBERT H. HUMPHREYS**
Golf Architect and Consultant

TO cities which contemplate the improvement of a public golf course, many of the delays incident to carrying out other public improvements can be avoided. Golf needs no brief. It has long since taken its place as the leading outdoor sport in the United States. More people are actively engaged in the game than in all other outdoor sports combined. In cities which have no municipal golf facilities there is a strong demand. Where public courses already exist, more are in demand.

Golf does not mean an added annual tax burden. Public golf courses are returning, through nominal fees, enough revenue to pay all maintenance costs and a sufficient amount besides to amortize their construction costs in between five and six years. This statement is based on the experience of courses constructed previous to the year 1930. With construction costs now less than 50 per cent of those for 1926 to 1929, it is reasonable to assume that a course built now would pay for itself in three or four years. In other words, public courses not only pay for their care, but return their original cost.

As to the speed with which the project could function in the immediate emergency, we find the following:

The necessary land is already available in most cases. It may be park acreage available for the purpose; it may be other public land, even a disused public dumping ground; it may be ground already designated and offered by a public-spirited citizen as a site for a public course. The condemnation period is eliminated. The plans and specifications can be prepared, under pressure, by a competent golf architect in not to exceed three weeks. There are ordinarily no questions of special assessments or of benefits and damages.

The item of advertising for bids and letting contracts is eliminated, for the reason that, since all construction work is of the simplest and since no skilled labor is required, it is actually better to operate on a force account basis under competent and efficient supervision. The proportion of labor to materials is very high; consequently almost all moneys expended go into payrolls and resultant relief.

Of course the original cost of the project must be met. Many cities are deciding that there is no reason why funds accumulated for charities cannot be used. These funds are in many essential respects similar to taxes. They are raised in a different manner and are often expended for no permanent good, but they are public funds and are used for public need. Why not make at least a portion of them create a permanent addition to the community assets? They can accomplish this end while serving the emergency need. Through golf construction, an avenue of employment is opened to any man who is able to work.

The undertaking should unquestionably be organized and administered by a special committee on which should be represented the Park or City Planning Department, the Mayor's Office, or the City Treasurer's Department, the Associated Charities, Chamber of Commerce, and such other civic agencies as each individual case might naturally include.

The Consideration of Acoustics in Municipal Auditorium Design

By GEORGE V. T. BURGESS
Acoustic Consulting Department,
Electrical Research Products, Inc.

AN auditorium is now recognized as an integral part of the municipal facilities required by most cities. It may be a specially built structure or the hall of the largest school building, depending on the particular requirements of the city. It must accommodate a variety of functions, such as civic meetings, lectures, concerts, plays, dances, pageants, and possibly athletic meets. If these activities are to be suitably taken care of, due consideration should be given to providing good acoustic conditions in the auditorium.

The modern type of building construction is such as to increase the difficulty of securing good acoustics in the design of auditoriums. For the multiple usages to which municipal auditoriums are put, it is necessary that they shall be built of the most durable and fireproof construction, with due regard to economical design. This implies steel framing, reinforced concrete floors, plaster on brick or tile walls, steel sash, steel roof trusses, and wood or concrete slab roofing. Because of the advisability of providing movable seating, collapsible wood or leather-covered chairs are used, and possibly a shallow balcony is built around the sides of the hall. This type of construction and furnishing necessarily makes the auditorium unduly reverberant, so that, with the exception of times when there is a capacity audience and a certain type of program where reverberation is not objectionable, the acoustics are likely to be poor.

Echoes and reverberation are produced by reflections of sound from hard ceiling, floor, and wall surfaces. Echoes are particularly noticeable where sound is reflected from curved surfaces of side walls or ceiling when the path length difference of the reflected sound is materially greater than that of the direct. Reverberation is a multiple echo caused by the diffused reflections from all surfaces with which the sound comes in contact. Such acoustic defects can be avoided in the original design of the hall by giving proper shape to the walls and ceiling, and also by incorporating in the construction sufficient amounts and properly located areas of sound-absorbing material. There are on the market a great many such materials from which one may be chosen that best harmonizes with the style of decoration.

An outstanding example of what can be done to make very bad acoustic conditions acceptable is that of Madison Square Garden in New York City. Because of the enormous volume, 6,200,000 cubic feet, and the type of construction, which was of reinforced concrete, wood, and steel, this auditorium had a reverberation period several times greater than the acceptable. The Garden therefore could not be used for concerts, political meetings, or any other type of program requiring good hearing conditions. By reason of the bad acoustics, the electrical amplification system was useless, because such a system serves to accentuate any of the bad acoustic features. By engineering analysis and instrumental measurements, the proper amount and location of acoustic materials were determined so as to produce the desired results. The event which made this treatment necessary was the presentation of a chorus of 1,000 Negro voices, a performance which was eventually put on very successfully. The severest test came,

AUDIENCE IN MADISON SQUARE GARDEN, NEW YORK, DURING PADEREWSKI RECITAL

however, when it was desired to provide a concert hall for Mr. Paderewski to play for the benefit of unemployed musicians. The illustration shows quite well the vast audience of 16,000 people who came to hear this noted pianist. For a single musical instrument playing in such a large auditorium, the acoustics had to be practically perfect to make the performance acceptable. That this was the case was amply commented upon by the leading New York musical critics the day after the concert.

Such sized auditoriums, however, are seldom built, so that it is perhaps of more practical interest to consider the case of the average hall. When the Senate Office Building was built last year, it was desired to provide good acoustic conditions in the two Senate Committee Hearing Rooms. These rooms were each 25 feet wide x 50 feet long, with a ceiling height of 17 feet, and are representative of the small auditorium. They would have been too reverberant for the rigid requirements imposed by the type of use for which they were intended. Even though the decorative scheme was more elaborate than is usual, suitable acoustic materials were selected to harmonize with the scheme and to provide the desired acoustic characteristics.

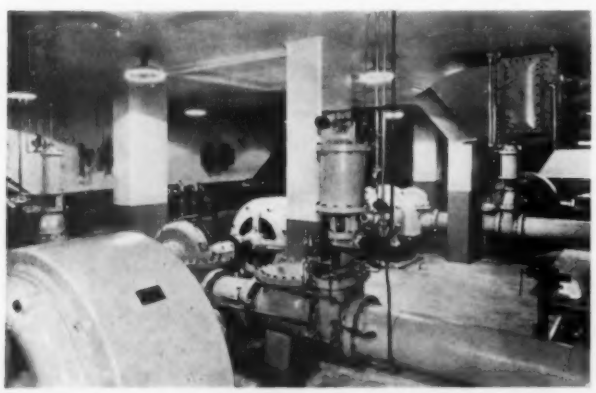
Electrical Developments for Pumping Stations

By **R. C. ALLEN**
General Engineering Department, Westinghouse Electric & Manufacturing Co.

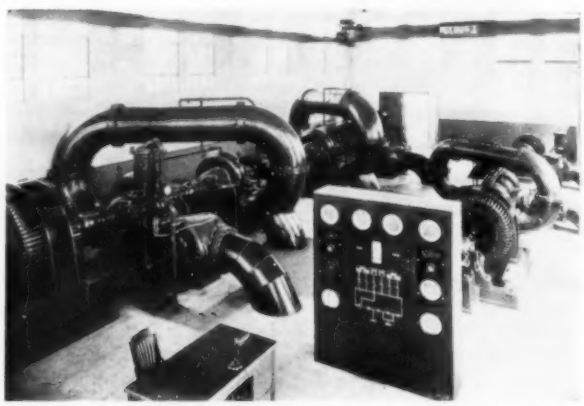
THE year 1931 showed a marked decrease in pumping projects for municipalities, despite the expectation of an increase to alleviate unemployment. This was undoubtedly due, in great measure, to the general depression affecting all industries, but probably was more the result of hastening the proposed and needed pumping additions into the 1930 schedule because of the drought scare of the previous year.

Among such plants, started during 1931, are the addition for the booster station at Springwells, Detroit; the new station at the village of Grosse Point, near Detroit; the Bethelehem, Pa., pumping plant; and particularly the full automatic Guilford pumping station of 48 m.g.d. pumping capacity in the residential district of Baltimore. The city of Baltimore is contemplating another full automatic station, which is of interest as limiting the amount of station attention required.

The pumping projects executed these last 12 months are fewer but in general larger than for the previous year. The Croton Lake station for the city of New York added 60 m.g.d. pumping capacity to reduce the water shortage hazard of two years ago. This required three 3,000-hp. synchronous motors and, since each motor was large as compared to the plant maximum demand, the control was designed to limit the starting current demand to steps of 125 per cent full load current necessitating step starting reactance with closed circuit transition.



PUMPING UNITS IN THE FULL AUTOMATIC CONTROL GUILFORD STATION, BALTIMORE
Built in the residential district and equipped with a 14-m.g.d. and a 10-m.g.d. pump with 600-hp. synchronous motors



THE NORTH HOLLYWOOD STATION, LOS ANGELES, EQUIPPED WITH 6,600-VOLT SYNCHRONOUS MOTORS

Another coast project, receiving much prominence and study during the year, is the Metropolitan Water District of Southern California, which will take 1,500 c.f.m. of water from the Colorado River for the city of Los Angeles through 250 miles of piping, tunnels, and aqueducts and seven pumping plants. The motors required will be some of the largest ever used for pumping purposes.

The city and county of San Francisco installed three 700-hp. units to increase their water supply.

Another large plant installed this year was the high and low pumping stations of the Mahoning Valley Sanitary District, near Youngstown, Ohio. This included 4,000 hp. in five synchronous motors, two being 1,400 hp., for handling an 85-m.g.d. pumping capacity. Here the double winding type of motor was used to limit the starting current.

It is expected, or hoped, that the coming year will permit the extension of the pumping facilities desired and really required in many of our growing cities. Lack of adequate good water is a serious menace to any locality, but particularly to cities with congested sections.

The disposal of city sewage through treating works is another phase of the pumping industry which is receiving the earnest study of many city engineers. Eliminating, or at least limiting, the pollution of our natural water supplies will greatly assist in the problem of obtaining satisfactory water.

Oh! Where—Oh! Where—Is the Wherewithal for Financing Our City Pavements?

Changing Our Habits—Legislative and Administrative Use of Gas Tax Money on State Routes within Cities

FOR discharging the necessary functions of government, general taxes in proportion to individual property interest in government are essential. When government began to perform special services and to make improvements benefiting particular districts or areas, the "special assessment" was conceived, and it was levied in proportion to the benefit received. Benefits, however, are more difficult to distinguish and appraise than property values and areas or frontage, and through incompetence, inertia, or delay on the part of the benefit in making itself evident, the easiest way has become the practice; that is, the cost is spread over the abutting property on a straight mathematical basis. In assessing taxes for city streets, the practice of levying the entire cost of hard-surface pavement against abutting property is so general as to be essentially the rule.

For every bit of pavement laid, the city as a whole benefits vastly. On a few streets, such as dead ends, the improvement is essentially local, but on all others the benefit extends over varying areas of a community, some streets being a benefit to interstate traffic. Some radical suggestions are therefore made as to methods of taxing city streets.

Types of Construction

Many cities standardize on one type of pavement for all services. Twenty-five years ago, when the paving engineer did not know as much about paving as at present, this may have been a natural thing to do. It must be admitted, today, that many mistakes have been made in the selection of the paving medium for a given thoroughfare. While the engineer authorities should decide on the types of paving to be laid, the property owners are entitled to whatever economy may result from such a classification of pavement design as will most economically meet traffic conditions.

Another problem is to lay enough paving to meet the conditions of living, without going to the expense of a pavement unwarranted by through traffic conditions. Consider the dweller in the outskirts of a city, struggling to purchase a home. His street is unpaved. He probably has a sidewalk, but at some seasons of the year the coal dealer, the grocer, and other tradesmen can't get near him because of impassable streets. His alternative is to build a complete pavement—concrete base, asphalt binder, and surface, with concrete or cut stone curbs, and catch-basins. There should be some middle procedure that will relieve such conditions without becoming confiscatory. Were there such a method, many streets yet unpaved would have had some sort of pavement long since.

Motor Traffic and Motor Taxes

The motor car has brought about the demand for good highways. The motor owner pays his regular taxes, including the special mill tax for highway purposes, taxes for interest and retirement of road bonds, and, in addition, weight and gas taxes. Of the approximate $1,500,000,000 spent for highways in 1930, $1,000,383,000 came from motor vehicles. Statements that the users are paying for the streets and highways are well founded.

Analysis of registration figures indicates that a minimum of 60 per cent of these tax receipts came from city car owners, by which is meant urban as distinguished from rural. Yet in 1929, $800,000,000 was spent for state highways, and less than $730,000,000 for county and local roads together; 5,677,500 strictly rural cars were registered in 1930, or 20 per cent.

That cities generally are not receiving an equitable proportion of these moneys has been evidenced by a general rebellion against the laws as usually set up to control the funds. Ohio's laws seem to be fairer than most in this regard. The 1931 revision of Michigan's law has given much needed relief in Detroit and up-state cities, but not enough. A revision throughout the country is imperative.

Additional Revenue

To carry on as we wish, more funds must be produced, or the present funds redistributed. The country at large is in no mood to consider additional tax burdens levied in the usual way.

Available data on the receipts from gas taxes indicate that gas sales have increased, and while this may be due to the gas war, the higher taxes on gas have not curtailed the use thereof. It may be possible to add one cent per gallon, or fractional part thereof, to be applied to local highway work alone, provided it is impossible to secure a more equitable refund of the gas taxes now turned into the state.

While counter to the general theories governing the construction and operation of highways, it may be suggested only as a method for unemployment relief that private capital may be interested in the construction of traffic arteries as toll roads, built with recapture clauses, effective after costs have been paid and a fair profit realized.

Long-Term Planning

A part of our trouble arises from failure to set up well-considered programs of construction. Where bond issues, special taxes and other sources of revenue have been available, it has not been necessary to adhere to a definite program. As a matter of pure administrative theory, it is far better, in general, to set up a program, with definite appropriations made therefor, and pay as you go, than to go in for bond issues and extraneous tax levies.

The long-term program idea is not new. Many such programs have been set up—a few followed. The new idea in connection with them is a measure for unemployment relief. This will be accomplished by prosecuting only

such work as is needed, holding the appropriations in reserve against industrial slumps, at which time the slack may be taken up by doing all of the scheduled work.

Where such programs include work in sections, where the improvement can be done more cheaply now than at some time in the future, and funds are not immediately available in the regular ways, a bond issue may be justified.

Procedure

The City Officials' Division of the American Road Builders' Association has prepared a resolution favoring the allocation of a greater portion of the revenue derived from the tax on gasoline to the improvement and maintenance of the extension of state routes within municipalities—and recommending that the gas tax money shall not be used for purposes other than the maintenance and improvement of highways.

Recommendations

The following recommendations, as a start toward a somewhat saner procedure in city paving, are offered to city officials:

1. A classification of city streets set up approximately as follows:

a. Streets in which essentially all the cost is borne by owners of abutting property.

b. Streets in which the owners of abutting property and the city share about equally.

c. Streets in which the cost is borne by the property owners, the city, and the county.

d. Streets in which the property owners, the city, the county, and the state share.

2. That pavements of at least three types be approved for city work:

a. The best for main thoroughfares.

b. A first-class but cheaper pavement for secondary thoroughfares, where preferred.

c. A very much cheaper pavement for the whole width of outlying streets; or a narrow pavement, without curbs, in order to permit traffic to pass through arteries where this is now impossible at certain seasons of the year.

3. Long-term planning in paving construction, with necessary work in progress during construction season, but holding back much desirable work to meet economic depressions.

4. The adoption, so far as is consistent with the best judgment of all concerned, of a pay-as-you-go policy. Bond issues entail tremendous interest charges. Special mill or fractional mill taxes rarely accomplish anything that cannot be accomplished in the regular order of budgeting, and they set up funds that may be diverted to other purposes unless assiduously used up as collected.

5. For purely local uses, it is recommended that an additional cent or fractional cent be levied as a tax on gas.

6. All gas taxes are not collected. If a much greater vigilance in the impost and collection of the gas tax money is exercised, we can augment the present receipts by many thousands of dollars.

7. A reapportionment of the gas and weight tax funds, with more equitable proportions returned to the cities directly (see the Ohio and Michigan laws, 1931). This is the source that should produce the greatest return, and as a start toward this end, it is recommended that at least 30 per cent of the tax on gas be apportioned to the cities for the construction, widening and maintenance of city pavements, in the discretion of the paving authorities of the cities.

ACKNOWLEDGMENT.—Prepared from a report of the Committee on Pavement Finance of the American Road Builders' Association, composed of: Chairman, Harrington Place, Engineer, Detroit Bureau of Governmental Research; A. D. Butler, City Engineer, Spokane, Wash.; J. F. Hale, City Engineer, Dayton, Ohio; W. W. Horner, Chief Engineer of Sewers and Paving, St. Louis, Mo.; J. J. Jessup, City Engineer, Los Angeles, Calif.; D. L. Lewis, City Engineer, Fort Worth, Texas; M. S. Murray, Director of Public Works, Kansas City, Mo.; W. E. Sheddan, City Engineer, Jacksonville, Fla.; H. C. Whitehurst, Coordinator and Chief Engineer, District of Columbia, Washington, D. C.; and J. M. Young, City Engineer, Dallas, Texas.

The President Summarizes Housing Needs

THE next great lift in elevating the living conditions of the American family must come from a concerted and nation-wide movement to provide new and better homes.

Every thrifty family has an inherent right to own a home.

Architects, engineers, inventors and manufacturers have now made possible beautiful homes incomparably superior to old types in plan, convenience and healthfulness, at no increase in cost.

Engineering practice applied to the arrangement of household facilities has made it possible to eliminate most of the drudgery of housekeeping.

Beauty is a commercial asset to the home builder, because it is a spiritual necessity to the home owner.

Financing the home owner is the most backward phase of the situation, and calls for new methods of extending credit on the part of banks and investment institutions, operating in this field.

Zoning and city planning save waste, reduce ultimate costs, and add attractiveness and other social values to stable investment values for home owners.

Slums have no excuse for being and should be eliminated by wise concerted effort.

More industries should move to the country, where workers may have better home surroundings.

Large-scale housing has proved well worthwhile, when wisely planned, and should receive encouragement and support from business groups.

Home ownership must not be taxed out of existence.

Rural homes can be made as beautiful and convenient as city homes.

Old homes should be modernized for the sake of health and convenience.

Laws affecting city housing conditions and the ownership and protection of homes need study and revision.

Women's special interest in homemaking should be recognized in all planning of a national program, particularly in the design, decoration, and interior arrangement of the house, and in all matters affecting the health and welfare of the family.

Research and the dissemination of its new knowledge through organized channels should be encouraged.

HERBERT HOOVER.

—From the Foreword to "Planning for Residential Districts," Volume I of the Publications of The President's Conference on Home Building and Home Ownership. (See page 129 of this issue.)

New Water Works for a South American City

A GENERAL VIEW OF THE NEW FILTRATION PLANT AT CALI, COLOMBIA

By **GEORGE C. BUNKER**
Consulting Engineer,
Ancon, Canal Zone, Panama

CALI is the capital city of one of the departments of Colombia, known as "El Valle," translated The Valley, which is located on the western or Pacific coast approximately midway between the southern border of Panama and the northern border of Ecuador. The Department derives its name from the gently sloping plain, 15 to 25 miles wide and 150 miles long, formed by the Cauca River, which extends from the northern to the southern border and lies between the central and western mountain ranges. The Cauca Valley has been described by a traveler who has roamed through many countries as "one of the real garden spots of the world."

Buenaventura, the chief port of the Pacific coast section of Colombia, is located in the same department about 360 miles south of Balboa, Canal Zone. From this port a railway runs in a southeasterly direction to Cali, a distance of 108 miles. From Cali one may continue to Bogota, the capital of Colombia, by railway, with the exception of a short automobile ride over an intervening mountain range which has not yet been pierced by a tunnel. With the present facilities, the incoming or outgoing traveler may make the trip between Buenaventura and Bogota in three days. From Buenaventura the fastest steamers of the Grace Line cover the distance to Balboa in twenty-four hours, and to New York, via the Panama Canal, in eight days; or the traveler may disembark at Balboa or Cristobal and make connections with steamers bound to many other ports. Buenaventura is also one of the stations on the route of the Pan American Airways System from Panama City to Montevideo along the west coast of South America.

Following the opening of the Panama Canal, the development of the inland transportation, and the port improvements at Buenaventura, Cali developed into the commercial, financial, and industrial center of the southwest section of Colombia. It is located on a plateau, about 3,000 feet above sea level, and enjoys a temperate climate, free from extremes of heat and cold and excessive rainfall. The population of Cali increased from approximately 28,000 in 1912 to approximately 100,000 at the end of 1928. Today the population has dropped to about 80,000 as a result of the return of laborers to the surrounding country during the past two years of depression. With the provision of a potable water supply, the greatest obstacles to the development of the city has been removed.

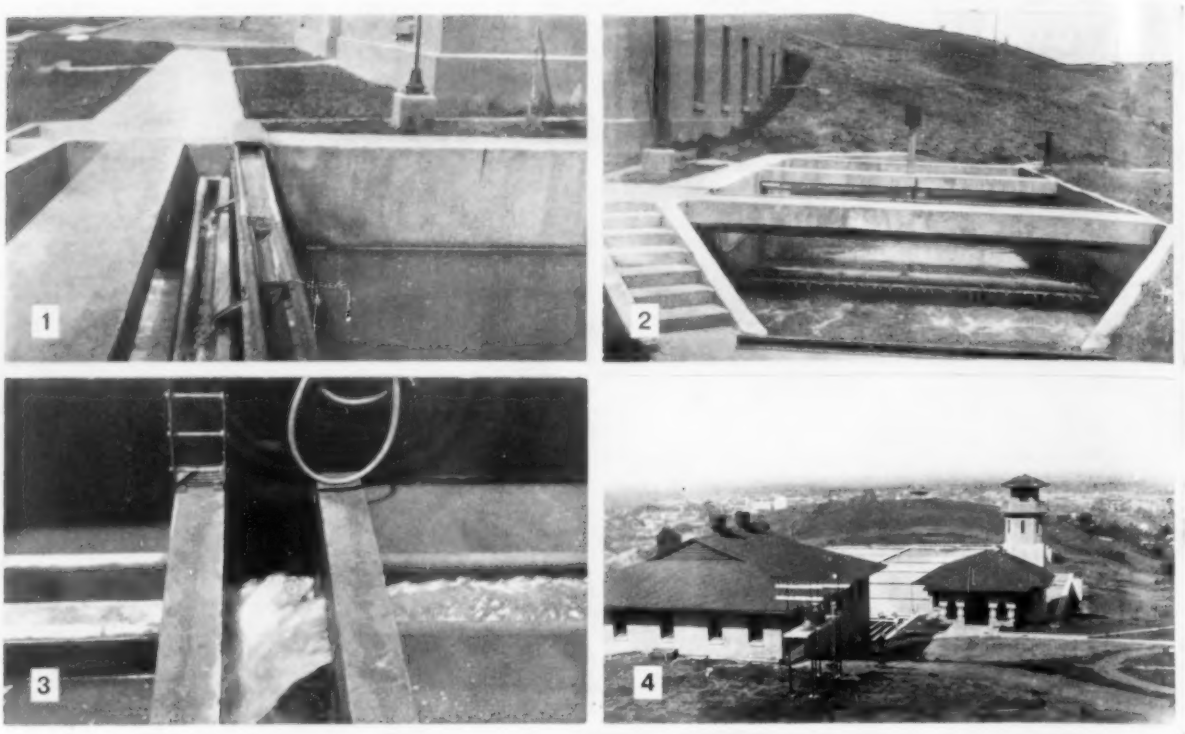
The construction of the existing water supply system, without the purification plant, was started in 1916, but was not completed until 1925, when water was distributed to all sections of the city. An open and unlined canal, 12,631 feet long, was constructed to convey water from the Cali River to an uncovered distribution reservoir, with a capacity of 1,453,000 gallons, located on San Antonio Hill at the west end of the city. From this reservoir the raw water flowed by gravity to a distribution system of cast iron pipe.

After the introduction of the public water supply, several epidemics of typhoid fever and dysentery occurred which finally aroused a group of citizens to the necessity of purifying the water. In the early part of 1927 the writer was engaged by the Board of Water Commissioners to investigate the water supply and to recommend the measures which must be taken to render it potable.

Survey of Drainage Area

A sanitary inspection of the drainage area of the Cali River revealed the sources of infection which were responsible for the prevalence of typhoid fever and dysentery within the city. The sewage from a college, with about 110 students and instructors, was discharged directly into ditches for irrigating gardens without being subjected to any treatment. During the dry months it is possible that all of the liquid wastes were absorbed by the soil, but during the rainy months many of the sewage bacteria were undoubtedly washed into a nearby tributary of the Cali River 3.1 miles above the intake of the water works.

There were also three small villages on the drainage



DETAILS OF THE CALI WATER WORKS

1. The distributing trough for the alum solution above the weir chamber. 2. The streams of alum solution hitting the water flowing over the weir. 3. Wash water discharging into the main trough, which divides the filter into two beds. 4. View of the plant from near the wash-water tank, showing the city in the background

area, with a total of about 150 houses, and a considerable number of summer homes were scattered over the hillsides. None of the houses contained water closets, a few were provided with privies, but for the majority the open fields served as unconfined depositories for the discharges of feces and urine.

The drainage area was also crossed by two public roads over which there was considerable traffic of men and animals conveying various materials to and from Cali. In my inspections of several drainage areas in Colombia I have found that the public roads contribute a relatively large amount of pollution to the streams from which water supplies are taken and that no attempt is made to divert the traffic.

As a result of the sanitary inspection of the catchment area, it was clearly evident that the water flowing in the Cali River and its tributaries was liable to infection by disease germs at all times, but with an increase in the density at the beginning of and during the rainy months,. The catchment area of the Cali River above the intake is relatively small, 22 square miles, and the river and its tributaries are swift-running streams with waterfalls, rapids, and many rocks to churn the water over and over so that the conditions are not favorable for an effective reduction in the bacterial flora by natural purification. The forest has been removed from large sections of the catchment area, with the result that the run-off during heavy rainfalls erodes the surface stratum of clay and carries comparatively large amounts of it into the river. From one section of the catchment area the run-off is highly colored.

Rapid Sand Filtration Plant

With these conditions prevailing, the writer recommended the installation of a rapid sand filtration plant on the site of the existing uncovered reservoir on San Antonio Hill at the west end of the city. This site was selected for three reasons: first, it permitted the incorporation of the existing tanks in the purification plant, thereby effecting an economy; second, it permitted the utilization of the existing canal as the conveyor of the raw water to the purification plant, thereby effecting an economy; and, third, it was the best site available for handling the water supply without pumping, which would not only increase the first cost of the water works but also the cost of operation and maintenance.

The necessary plans, specifications and bills of materials were authorized by the Board of Water Commissioners. The plans were delivered in November, 1927, and active construction work was started in January, 1928. With the exception of the sand, gravel, and small quantities of rough lumber, all the materials were ordered from the United States, with Gillespie & Co. Inc. of New York, importers and exporters, acting as purchasing agents. The portland cement was kept in sealed storehouses at the mill, prior to shipment, until the results of tests made by a testing laboratory were reported. All the shipments of cement complied with the specifications of the American Society for Testing Materials.

Design of the Plant

The plant was designed for an initial capacity of 8

m.g.d. on the basis of a daily consumption of 66 gallons per capita. This consumption was based on the installation of meters, and the writer does not advise its use in calculating the capacity of a purification plant for a city in South America with a distribution system which has been in use several years, unless meters are installed before the plant is placed in service. Without meters the daily consumption of filtered water will exceed 66 gallons per capita, owing to excessive waste by the consumers and to leakage from the distribution system, with the result that the plant will be unable to supply a sufficient volume of filtered water during the hours of maximum consumption.

The plant was so designed that its capacity may be increased to 16 m.g.d. with no interruptions in the supply of filtered water to the city, and the necessary land has been reserved for this expansion, and more, if the future growth of the city requires it. On the basis of a daily consumption of 66 gallons per capita, this capacity will be sufficient for a population of 242,000.

The Head House

The head house is a simple and plain two-story building constructed of a reinforced concrete skeleton with curtain walls of brick. It measures 60.4 x 50 feet in plan, inside measurements. Both floors are of reinforced concrete; the second floor is supported by beams and columns and is designed for a load of 400 pounds per square feet. A maroon-colored roof of protected metal, manufactured by the H. H. Robertson Co., is laid over a steel framework.

The ground floor is utilized for two steel tanks with orifice boxes for applying soda-ash or lime to either the raw or the filtered water or both; two alum machines; an air-compressor and two air-storage tanks; a motor-driven centrifugal pump for delivering raw water to lines of hose for cleaning the mixing chambers and settling basins; a workroom; a storeroom; and two lavatories.

The second floor is used for the storage of alum, soda-ash, and lime. By means of a short branch from the main road into the plant, trucks may deliver the chemicals at a door opening on this floor, thereby eliminating a hoist.

The raw water flows by gravity from the intake, through an open canal, into a reinforced concrete weir chamber, 39 feet long by 16 feet wide, with an average depth of 6.56 feet, set on the north side of the head house and close to it. A sharp crested weir, without end contractions, made from a bronze plate, is set across the discharge end of the chamber. The width of the weir is such that a maximum flow of 28 m.g.d. may be accurately measured. By means of a Stevens Type L water level recorder, a graph is made of the depth of water flowing over the weir, and from a conversion table the operators obtain the volume per minute. The volume of water flowing over the weir is regulated by a hand-operated sluice gate on a 20-inch waste line from the chamber.

Alum Dosage

The alum solution flows by gravity from the machines through a short canal in the ground floor of the head house to a perforated lead trough across the chamber above the weir. The streams of alum solution drop down upon the raw water just after it flows over the crest of the weir. The alum machines are so located that the canal to the distribution trough is short, and removable covers of steel plate permit it to be cleaned quickly and easily. For cleaning the holes in the distributing trough, the operators use an ordinary floor broom.

The alum machines are of the type developed by W. H. Donaldson and altered later by F. M. Veatch. This type was selected in preference to motor-driven dry feed machines because it was feared that interruptions of considerable length might occur in the power service during periods of muddy water and under conditions which would not permit a shut-down of the plant. The correctness of the selection was demonstrated during the first year of operation when two interruptions in the power service occurred, as a result of wind storms, while the turbidity of the raw water was high. As the operation of the machine selected depends only upon a flow of water through the cage containing the lump alum, a failure in electric power does not interrupt the application of the alum solution to the raw water. This type of machine was selected in preference to solution tanks and orifice boxes because it occupies less floor area.

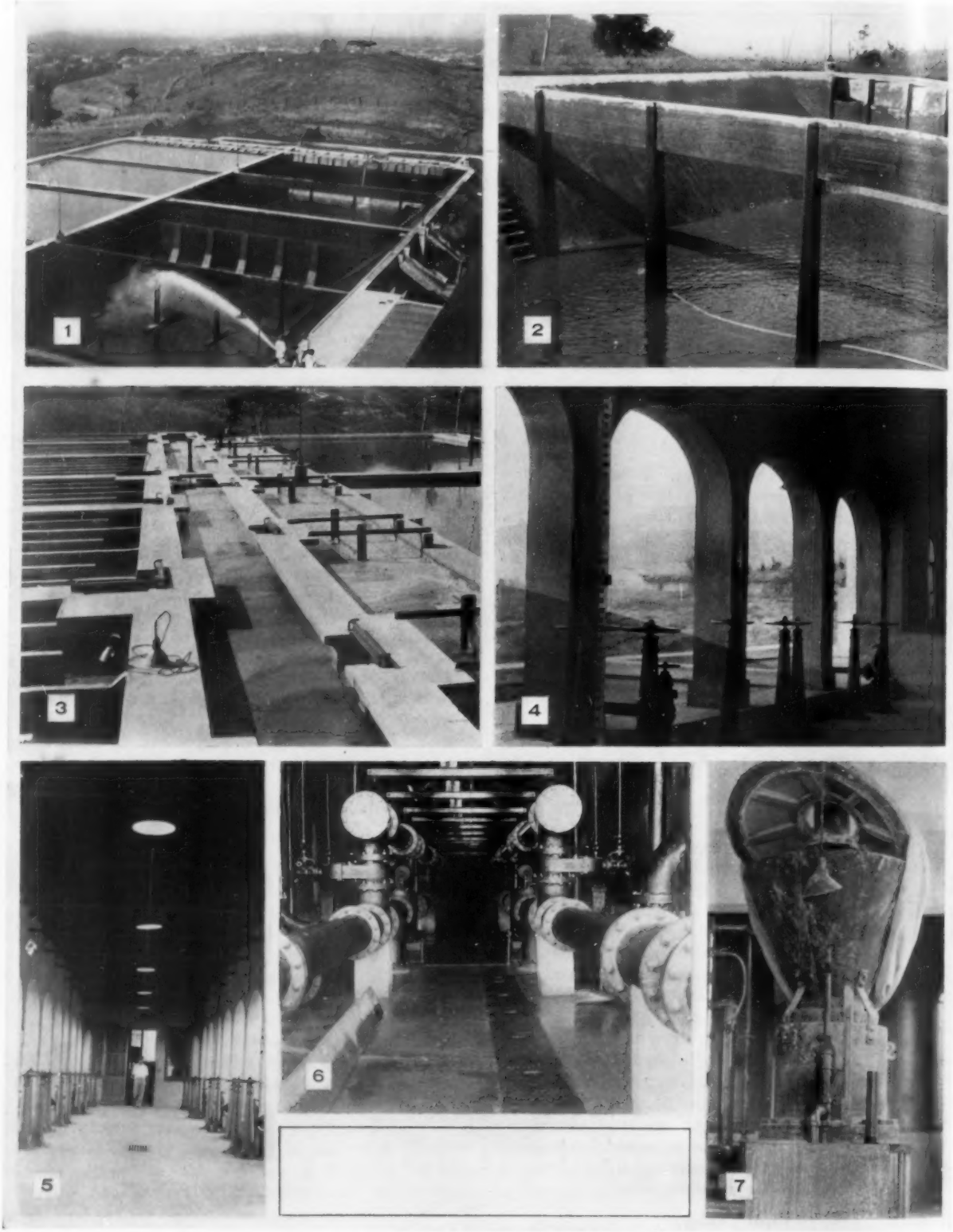
The alum-treated water after dropping over the weir is divided into three equal parts and flows into the three adjoining mixing chambers, which are approximately 40.12 feet long, 31.92 feet wide, and 6.56 feet deep. Each chamber is divided into thirteen compartments by reinforced concrete baffles of "around-the-end" type, spaced 3.06 feet apart, with an end opening 2.73 feet wide. Plug valves are provided for washing out the chambers. With a normal operating flow of 8 m.g.d. through the plant, and with the three chambers in service in parallel, the mixing period is 30 minutes, the velocity of flow is approximately 14 feet per minute, and the loss of head is about one inch. Under these conditions, with the temperature of the raw water varying from 17 to 24° C., an excellent floc is formed. Experiments have demonstrated that an excellent floc is also formed when the rate of flow is increased to 12 m.g.d., and this may be taken as the maximum working capacity of the three chambers.

Settling Basins

A channel, 5.47 feet wide by 6.89 feet deep, is set between the mixing chambers and the settling basins to receive the water from the former and to distribute it into the latter. By means of wooden gates, the water from the mixing chambers may be discharged into either the north or the south settling basins when one of the latter is taken out of service for cleaning.

As the old distribution reservoir did not provide sufficient sedimentation capacity, it was extended to join the channel mentioned above. The tanks thus formed were made into two settling basins, by a center wall of reinforced concrete along the longitudinal axis, each of which is 257 feet long by 60 feet wide. The depth of the new sections varies from 11 feet at the summits of the flat V floor to 14 feet at the gutter in the valley. The average depth of the old sections is 13 feet. The walls, dividing the old reservoir into two sections and separating it from the new extension, both at right angles to the new center wall, were cut down and made into submerged baffles. These baffles also divide each basin into three sections.

The treated water flows from the channel across the ends of the mixing chambers into the first section of the settling basins and strikes a wooden baffle which deflects it downward and also distributes it across the entire width of



DETAILS OF THE CALI WATER WORKS

1. Washing one of the settling basins. The stream of water is hitting a stilling baffle. 2. The third or outlet section of one basin, showing the stilling or wind baffle. 3. The mixing chambers at the left, then the distributing channel and the walk supported by columns with slots for the deflecting baffles. 4. The operating floor of the filters, showing part of a filter, the valve stands, loss of head gage, and filter operators' room. 5. The operating floor with the operators' room at the far end, and the grate in the floor for communication with men in the pipe gallery. 6. The pipe gallery, with the dual pipe system and plenty of headroom. 7. The alum machine, with the hopper lid raised to show the delivery pipe from the floor above. The alum solution drops into the lead-lined concrete box in the foreground

the basin. Midway between this baffle and the first submerged baffle a stilling baffle is provided to reduce the wave action during the strong winds which blow nearly every afternoon. The water then flows over the first submerged baffle into the second section and is turned downward again by a deflecting baffle, placed 3.84 feet in front of the former, which extends 6.5 feet down from the top of the basin. A stilling baffle is provided in this section. The water then flows over a second submerged baffle into the third or last section of the basin. Similar deflecting and stilling baffles are provided in this section.

The settled water flows over a skimming weir into a trough, from which it is conveyed through concrete conduits, around the southeast corner of the basins, to a concrete box from which duplicate 30-inch cast iron pipe lines carry it to the filters. The capacity of the conduits and pipe lines is 16 m.g.d., so that no changes will be required until the capacity of the plant is increased beyond this volume. Space does not permit a detailed description of the manner of removing the settled water to effect an even pull on it across the entire width of each basin, and the withdrawal of equal volumes from both basins.

The necessary appurtenances are provided for cleaning and operating the basins. During the first year's operation of the plant the basins were cleaned at intervals of approximately sixty days.

The combined capacity of the two basins is 2,431,000 gallons. With 8 m.g.d. flowing through both basins, at the normal working level, the theoretical detention period is seven hours and the velocity of flow is approximately 0.58 feet per minute.

The Filters

There are eight rapid sand filters, arranged in two parallel rows of four each, with a pipe gallery and operating floor between them. The four filters on the north side are set against the south wall of the settling basin, and the rear of two filters and part of a third forms a common wall with the adjoining section of the settling basin. The remainder of the rear wall of these filters is independent of the wall of the settling basin because the side wall of the old reservoir is laid on a slope. Between the end of the existing pipe gallery and the box into which the settled water conduits discharge, space has been left for the addition of eight filters. Tees were set in the duplicate settled water lines, so that connections to future filters may be made with a minimum amount of interruptions in the normal operation of the plant.

The reinforced concrete filter boxes measure 14.44 x 27.3 feet in plan by 11.94 feet deep, inside measurements. Each filter is divided into two sand beds by a main trough; each bed measures 14.44 x 12 feet in plan, giving a sand area of 173.3 square feet; the normal working capacity of each sand bed is 0.5 m.g.d.; and the total capacity of each filter is 1.0 m.g.d.

Each section of a filter is provided with two reinforced concrete wash-water troughs set at right angles to the main trough which divides the filter into two sections. The underdrainage system is of the Harrisburg type, with cement-lined cast iron manifolds and laterals with spun brass eyelets in the holes of the latter. A separate air distribution system, of cement-lined cast iron pipe, is set at such an elevation that the laterals are under the top layer of fine gravel. A 24-inch bed of graded gravel supports 30 inches of local sand washed to obtain an effective size of 0.42 mm. and a uniformity coefficient of 1.6.

The pipe gallery is 13.12 feet wide and 12.86 feet high, with an unobstructed passage through its entire length, 7.7 feet high by 4.2 feet wide. Each row of filters has a system of piping and valves entirely separated from a duplicate system for the other row. All of the piping, with the exception of the air and the small water lines, is of cement-lined cast iron. Gate valves, operated by extension stems to the operating floor, are used in preference to hydraulic valves.

The rate of filtration of the two beds of each filter is regulated by one Simplex controller. The eight controllers discharge into a conduit under the floor of the pipe gallery from which a branch turns off at right angles, between filters Nos. 6 and 8, and runs into a concrete chamber set outside the south wall of the filters. A weir is placed in this chamber at such an elevation that the filtered water running over it forms a seal over the discharges from the controllers. The filtered water then flows by gravity from this chamber to the aerator through a concrete conduit. The capacity of the above system of conduits is 16 m.g.d. The solution of chlorine from the chlorinators flows into the filtered water at a point approximately 20 feet behind the weir and is thoroughly mixed with it by the currents back of, over, and below the weir.

The entire length of the operating floor is covered with a roof of Robertson's protected metal laid over a steel framework. The filters are uncovered, which effected a considerable reduction in the cost of the filter building. A section of the operating floor, 27.56 feet long, adjoining the administration section of the filter building, is closed in to make a control room for the operators. Duplicate W. & T. vacuum type chlorinators are installed in this room.

The west end of the operating floor adjoins a one-story building which contains a reception room and a combined office and laboratory. From the latter the head house, mixing chambers, settling basins, and four of the filters are visible. The laboratory is equipped for making the necessary bacteriological and chemical tests. A tower is placed in one corner of the building to improve the architectural appearance and to provide a point from which the visitors may overlook the entire plant and obtain an excellent view of the city and the surrounding country.

The Aerator

The filtered water aerator, of the "riffle type," consists of eight units, arranged in two rows of four each with a main trough between them. Each unit consists of a concrete trough from each side of which a concrete slab slopes downward. On the inclines thus formed, thin strips of cast iron are set on edge in parallel rows so that they project 2 inches above the concrete slabs. The filtered and chlorinated water flows by gravity into the main trough and thence into the lateral troughs and down over the "riffles." From the troughs at the bottom of the aerator the water may be diverted either into the reservoir or into the 24-inch supply main to the distribution system. The aerator is covered with screening of about 3/16-inch mesh to prevent leaves, birds, bugs, etc., from entering the water.

Reservoir, Pumping Stations and Wash-Water Tank

The combined clear-water basin and distribution reservoir, with a capacity of 2.0 m.g., adjoins the aerator. It is lined on the sides and bottom with reinforced concrete and covered with a galvanized corrugated steel roof laid over a steel framework supported by concrete columns. Owing to excessive leakage, a waterproofing membrane was laid over the entire interior surface of the reservoir. A 24-inch cement-lined cast iron pipe line carries the filtered water by gravity from the outlet chamber to the distribution system in the city, and a Simplex low head meter provides the necessary data concerning the consumption.

A small pumping station, constructed of reinforced concrete and brick, is set close to the 24-inch outlet from the reservoir at such an elevation that there will always be a positive head of water on the two motor-driven centrifugal pumps, one of which may be operated by a gasoline engine in case of power failure. The capacity of each pump is 500 g.p.m. An 8-inch cement-lined cast iron pipe line is run from the outlets of the pumps to connect with a 12-inch line, of the same material, which is run from the pipe gallery to the wash-water tank and serves as a common inlet and outlet.

The wash-water tank is a covered circular reinforced concrete tank with an inside diameter of 24 feet, a depth of 16.5 feet, and a capacity of 50,000 gallons. The topography of the ground was such that the elevation desired was available at a point relatively close to the head house and filters.

AIRPLANE VIEW OF THE CALI WATER WORKS

Because of financial difficulties, the waterproofing of the reservoir was not completed until the end of October, 1930. The plant was placed in regular operation on November 1, and by December 26, 1930, the distribution system had been thoroughly cleaned and the water was potable. Routine bacteriological examinations have indicated that the water in the distribution system has met the revised U. S. Treasury Department B. coli standard.

The approximate cost of the plant, exclusive of the cost of the 24-inch cement-lined cast iron pipe line to connect the reservoir to the distribution system, was $530,000. The cost of operating and maintaining the plant, at the present time, is approximately $9.84 per million gallons, exclusive of interest and depreciation charges.

Personnel

Plans and specifications and the superintendence of construction were prepared and directed by the writer as consulting engineer, with Lewis B. Moore as resident engineer. The writer, assisted by Horace Weltmer and W. J. Hunt, trained the Superintendent, Luis C. Cifuentes, and the operators in the fundamentals of their work during the "tuning-up" period of the plant. The writer makes inspections of the plant at intervals of six months and during the interim receives weekly and monthly reports.

Public Utility Regulation for the Public Interest

A NOTABLE gathering of outstanding men in close contact with the problems of public utility regulation who are dissatisfied with the present status of regulation, with regard to the public interest, met in New York on April 8 for a two-day discussion of the regulatory situation and means of improving it. A number of Federal and state commissioners were among the one hundred or so persons present at this Round Table Conference on Regulation.

Prevailing valuation doctrine, irrational consolidations, overcapitalization, uncontrolled service charges and other holding-company practices, and the disproportion between classes of rates, were particularly criticized. As a program for consideration, the following was presented by a policy committee consisting of Frank P. Walsh, chairman, Robert W. Bruere, H. W. Dodds, Harold Evans, John H. Gray, W. H. Hamilton, Richard Joyce Smith and Stephen Raushenbush:

Revision of the present uniform classification of accounts to serve as a guide in establishing the equities of the various rates as well as of total earnings.

Development and adoption of a technique of regulation in accordance with which public service commissions will operate as effective administrative bodies charged with safeguarding the public interest. This will include provision for the initiation by the commissions of rate changes and other constructive steps in the interest of consumers on the basis of aggressive fact finding.

Establishment by law of the prudent investment principle of valuation as the public policy of the nation and the states for purposes of rate control.

Rate determination on the basis of actual cost of each class of service, including a fair profit on the capital required for such service.

Federal incorporation of holding companies with adequate control over their security issues and requirement of uniform accounting and periodic disclosure of their financial operations.

Withdrawal of the powers of the lower federal courts to review and nullify the decisions of state public service commissions, leaving the protection of constitutional rights to the state courts and, ultimately, to the United States Supreme Court.

Provision for publication by the state commissions of a regular bulletin designed to distribute in popular form data on rates, costs, net earnings, etc., gathered by the staff.

Authorization of municipalities after referendum vote of their citizens, to build or acquire by condemnation and operate public utility plants and distribution systems, and to form power districts for the same purpose, without securing certificates of convenience and necessity from a public service commission.

Provision for national and state power planning, either by existing commissions or by special boards, so that future developments may be economically sound and in accord with the needs of the people.

Waste Places Become Beauty-Spots

By ELMER T. PETERSON

ALMOST incredible transformation of waste places and bare, unattractive areas has been accomplished by entrants in the More Beautiful America Contest, sponsored by the magazine *Better Homes and Gardens*. The accompanying photographs are only fragmentary testimony to the outdoor beauty attained in the process of the contest.

The Reinisch Rose Gardens and Rose Test Gardens, of Topeka, Kans., won first place with an entry which transformed the raw prairie into a place of fairyland loveliness. It was entered by the Topeka Horticultural Society and is a part of Gage Park, Topeka. The prize was $1,000.

WINNER OF THE FIRST PRIZE—THE REINISCH ROSE GARDENS, TOPEKA, KANS.
The two photographs of the formal area were taken six weeks apart

THIS TRANSFORMATION OF THE OLD ROCK QUARRY IN GREENVILLE, S. C., WON SECOND PRIZE IN THE CONTEST

This project was a monument to the life and work of E. F. A. Reinisch, who for thirty years acted as Superintendent of Parks at Topeka. It was his dream to establish a rose garden, but he did not live to see his vision realized. Thomas Doran, a Topeka attorney, I. D. Graham, then President of the Topeka Horticultural Society, Dr. C. F. Menninger, and others, took up the work. Mr. Doran was appointed chairman of a committee to raise funds. Through his efforts and the cooperation of civic bodies and individuals, the sum of $26,000 was finally secured. The total labor, however, represented at least $50,000, for much of the work was donated.

The work was begun in the spring of 1930. A large glacial boulder weighing twelve tons was placed at the entrance of the gardens, to hold the plate bearing an inscription in honor of Mr. Reinisch. On April 24 the formal pool was completed and on Memorial Day, 1930, the plantings were well under way. The second year was largely devoted to the making of the informal rock garden area. All the rocks were hauled to the site and were contributed by nine different states and 18 different Kansas counties. About 9,000 rose plants were planted in 1930, and in the spring there were 5,338 new plants besides replacements. Gigantic waterlilies, some of them large enough to support a man, were used in the pools. Many varieties of flowers were used, including peonies and a wide variety of shrubs and trees. On Arbor Day, April 1, 1931, appropriate ceremonies were held and a willow oak tree more than 25 feet high was planted in honor of E. T. Meredith, founder of *Better Homes and Gardens* and Secretary of Agriculture in President Wilson's cabinet. A more elaborate celebration is planned for June 11, when Fred O. Bohen, President of the Meredith Publishing Co., will make the formal presentation of the prize.

Photographs by courtesy of Better Homes and Gardens

THE IRIS GARDEN CLUB, ATLANTA, GA., WON THIRD PRIZE WITH THIS ROCK GARDEN POOL

The second prize, of $500, was won by the Greenville Garden Club, of Greenville, S. C. In this instance a community eyesore near the center of the city, called "The Old Rock Quarry," was made into a beauty-spot. The tract had been used as a dump. Now it is a dreamland of flowers and verdure, with brooks and pools taking the place of unsightly gullies. The rocks on the site were skillfully used in the general scheme.

The Other Prize-Winning Projects

The third prize, of $400, went to the Iris Garden Club, Atlanta, Ga., for a somewhat similar project. The little village of Boxford, Mass., 30 miles north of Boston, took fourth prize, $300. With a population of only 350, the whole town went to work and effected a remarkable transformation centering upon the village church. The fifth prize, $200, went to the Independent Presbyterian church society at Birmingham, Ala., which made over the large grounds of a church. The winner of the sixth prize, $100, was, in some respects, the most remarkable project of all, for it consisted of the entire town of New Richmond, Wis., with a population of 2,000. A firm of landscape architects was employed and they landscaped the entire town, providing for numerous playgrounds, parks, a municipal golf course, a civic center, several lakes, a winding stream and a general clean-up. The work will be an outstanding achievement in civic beautification.

The judges in the contest were Dr. J. Horace McFarland, of Harrisburg, past President of the American Civic Association and President of the American Rose Society; Dr. Frank A. Waugh, noted landscape authority at Amherst, Mass.; W. T. Warren, architect, Birmingham, Ala.; Jay N. Darling, President of the Des Moines Park Board and well known as cartoonist, artist and conservationist; and City Landscape Architect Fred N. Evans, of Sacramento, Calif.

Doctor McFarland, who has had thirty years of experience in such matters, says that this contest is the best of its kind he has ever seen, with an amazing number and diversity of entrants—132 in all, from 40 states. Honorable mention was given eight other cities—Walla Walla, Wash.; Salem, Va.; Columbus Grove, Ohio; West Newport Beach, Calif.; New Ulm, Minn.; Sandersville, Ga.; Berrien Springs, Mich.; and Springfield, Mo. The contest extended from March 15, 1930, to October 1, 1931, so as to cover two growing seasons.

The publishers and editors of *Better Homes and Gardens* are highly elated over the success of the contest, and are glad to have been of some service in promoting the cause of civic beautification throughout the land. It is believed that the winning projects will serve as models for the whole country to follow, and there are already some striking evidences of continued beautification in each community represented, since the projects are also models for home gardeners.

The 1931 Inter-Chamber Health Conservation Contest

WINNING cities in the 1931 Inter-Chamber Health Conservation Contest, sponsored by the Chamber of Commerce of the United States with the cooperation of the American Public Health Association, for the six population groups in the contest, are as follows:

Group One, cities more than 500,000 population—Milwaukee, Wis.
Group Two, 250,000 to 500,000 population—Rochester, N. Y.
Group Three, 100,000 to 250,000 population—New Haven, Conn.
Group Four, 50,000 to 100,000 population—Evanston, Ill.
Group Five, 20,000 to 50,000 population—Brookline, Mass.
Group Six, under 20,000 population—La Salle, Ill.

The 1931 contest has been the most successful of any during the three years the contest has been held. For the year there was an increase of more than 27 per cent in enrollment over 1930. The 265 cities competing represented 45 states, the District of Columbia and Hawaii. Although the requirements in 1931 were considerably more exacting than in 1930, more than 70 per cent of the cities in the contest for both 1930 and 1931 made higher scores for the latter than for the former year. If allowance is made for the higher requirements, more than 90 per cent of these cities made higher scores in 1931 than in 1930.

Activities in bringing about definite health improvements have been carried on by local chambers of commerce, medical societies and health groups, many of them requiring community cooperation on a broad scale.

In addition to the winning cities, others were given honorable mention. Some of the honor cities were close runners-up to the winners. Honor cities in the six groups, listed alphabetically, follow:

Group I	Group II	Group III
Baltimore	Cincinnati	Grand Rapids
Detroit	Kansas City, Mo.	Hartford, Conn.
Philadelphia	Minneapolis	Syracuse
Pittsburgh	Newark	Utica
St. Louis	Toledo	Yonkers
Group IV	**Group V**	**Group VI**
East Orange, N. J.	Alhambra, Calif.	Chestertown, Md.
Harrisburg, Pa.	Maplewood, N. J.	Lodi, Calif.
Kenosha, Wis.	Newburgh, N. Y.	Monrovia, Calif.
Pasadena, Calif.	Orange, N. J.	Palo Alto, Calif.
Racine, Wis.	West Orange, N. J.	Shorewood, Wis.
	Watertown, N. Y.	

Awards to the winning cities will be presented May 17, at the twentieth annual meeting of the Chamber of Commerce of the United States at San Francisco.

Sewage Treatment Works Built During Period of Low Prices

By V. W. WHITFIELD
E. T. Archer & Co., Kansas City, Mo.

MC PHERSON, KANS., has taken advantage of the existing low labor and material prices to secure sewage treatment works that rank amongst the most modern in the state. For several years the construction of this plant had been considered an essential improvement; in fact, in 1929 the State Board of Health had issued an order instructing the city to prepare plans, but the City Commissioners had secured a temporary deferment.

Late in 1930, the unemployment problem became more and more acute. Some months previously, oil had been found near McPherson, and the population had increased at a rapid rate. Later, drilling had shut down, and many who had moved to the city, hoping for employment, were out of work, with no prospect for improvement in sight. At that time, the city officials perceived a double opportunity, and E. T. Archer & Co., of Kansas City, Mo., were retained to report on the methods to be used, and the probable cost of sewage treatment works.

The engineering report showed that a plant of sufficient size to serve McPherson for many years to come could be built for $82,000, or, on the basis of a design population of 8,000 people, only slightly over $10 per capita. This amount the city felt it might be wise to spend, since it would guarantee work for many of the residents for a period of some five or six months, and, at the same time, allow the city to secure a much-needed improvement. The engineering firm was therefore ordered to proceed with the final plans and specifications.

Two Older Plants Superseded

Previous to the construction of the new plant, McPherson was served by two smaller sewage treatment plants. One of these, treating the sewage from some 4,000 people, was located in the south part of town, and consisted of an old septic tank, followed by sand filters. The other, serving about 2,000 people, was located in the southeast corner of the city and consisted of an Imhoff tank with no provision for either secondary treatment or sludge drying. Since both of these plants were situated in districts that would eventually be built up, and since they were both of antiquated design, it was deemed best to abandon them both, allowing the contractor for the new plant to secure from them such salvage as might be suitable previous to their demolition.

The proposed design contemplated the consolidation of these two plants at a point about a mile southeast of the city in a location where the probability of future habitations was remote; and where the odors that might be expected from the type of plant selected—a trickling filter, preceded by clarification with separate sludge digestion—would cause no nuisance.

Sewage Pumping Station

As finally planned, the sewage from the two districts flows into a combined pump well and screen chamber. Here, after screening, it is raised by one of duplicate 500 g.p.m. Fairbanks-Morse centrifugal sewage pumps to a clarification tank equipped with a Link-Belt sludge collector. This clarifier has a capacity of about 53,000 gallons, large enough to retain the sewage for a period of two hours at the maximum rate of flow.

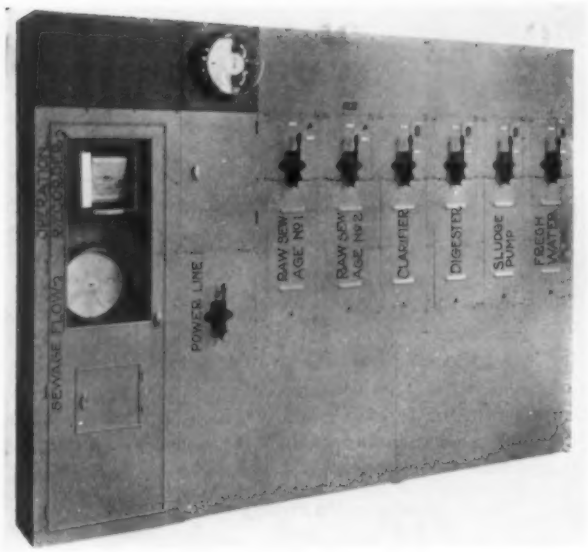
Sludge is pumped from the clarifier and from the final settling tank by means of a Barnes-Dorrco plunger type sludge pump to a Hardinge equipped digester, designed on the basis of 2 cubic feet per capita. Provisions are made to heat the sludge by means of a boiler, using gas given off by the sludge as fuel.

Rotary Distributors for Trickling Filters

From the clarifier, the settled sewage flows to two rock filter beds, each 90 feet in diameter by about 8 feet deep,

ABOVE.—SLUDGE BEDS, CLARIFIER, OPERATING BUILDING AND DIGESTER AT THE McPHERSON SEWAGE WORKS

BELOW.—A VIEW OF THE FILTERS AND SLUDGE BEDS



THE OPERATING SWITCHBOARD

containing about a half-cubic-yard of rock per person served, the conventional figure for a plant of this type. The sewage is distributed over these beds by means of two Cresset type rotary distributors as manufactured by Adams Hydraulic Ltd., of York, England, and distributed in the United States by the Francis Hankin Co., of Montreal, Canada. Each of these distributors consists of four pipes radiating from the center of the bed, with perforations spaced to secure adequate distribution. The impulse of the flowing sewage causes the distributors to revolve, spraying fine streams of the liquid over the entire surface of the bed.

After filtering through the beds of stone, the sewage flows to a final settling tank, where it is allowed to settle for an additional period of an hour and a half at the maximum rate of flow.

Sludge Drying

Eight sludge drying beds are provided, so that small amounts of sludge may be drawn at frequent intervals. In too many plants the number of sludge beds is limited—a condition that necessitates the drawing of large volumes of sludge at widely spaced periods. This usually results in upsetting the reduction process in the digester.

Costs

On completion of the plans, and their approval by the State Board of Health, construction contracts were awarded the W. B. Carter Construction Co., of Wichita, Kans.; the city required the use of hand labor on the new outfall lines, and specified that all common labor was to be drawn from lists of McPherson residents as registered at the City Hall, and paid a minimum wage of 40 cents an hour.

Even with these unusual exactions, the contract price was much below what the city had anticipated, the low bid for the plant complete, including almost a mile and a half of 15-inch outfall line, being $63,925.

Possibly the outstanding feature of the plant is the care used in its design. In a city the size of McPherson biochemical oxygen demand tests are seldom run on composited samples. It is still more infrequent that the engineer finds available records of similar tests made some years back. Nevertheless, it is only by having this information at hand that safety of design in cities having a wide range of industries is assured. Then, too, at McPherson, the major portion of the equipment was purchased previous to commencing the actual design of the plant proper. This made it possible to select that portion of each manufacturer's equipment that seemed best suited for the service proposed, and at the same time allowed the engineers to anticipate many of the operating difficulties that ordinarily must be ironed out after the plant is built.

Taken as a whole, the city of McPherson feels that the money has been well spent. The city has, for the time being, solved one of the most perplexing problems of any municipality, and has furnished many of its people the wherewithal to live.

Tax Claims Against Bankrupt Estates

By A. L. H. STREET

WIDESPREAD insolvency brings to the fore important provisions of the national bankruptcy act, concerning the priority of claims for taxes over other debts of persons and private corporations.

It is often erroneously supposed that claims for unpaid taxes are to be paid in full before anything is distributed to other creditors of a bankrupt estate. On the contrary, under section 64 of the Bankruptcy Act, as amended in 1926, tax claims rank sixth in order of preference, although subject to payment in full before any dividend is payable to general creditors. The order of priority of right to payment in full is: (1) cost of preserving bankrupt estate; (2) filing fees paid by petitioning creditors and expense of recovering concealed, etc., assets; (3) cost of administering estate; (4) creditors' expense in successfully opposing composition; (5) wages, etc., due workmen, etc., earned within three months before bankruptcy and not exceeding $600 to each claimant; (6) "All taxes legally due and owing by the bankrupt to the United States, state, county, district, or municipality." Real estate tax must not exceed value of bankrupt's interest therein.

We summarize a few of the most important interpretations that have been placed upon the Bankruptcy Act, on this subject, by the courts:

"Taxes," under this head, include not only general property taxes but also local assessments, license fees, franchise taxes, etc. Water service charges assessed against property have been held to be covered by the priority provision. (Collier on Bankruptcy, 13th ed., 1450 et seq., and Supplement.)

The United States is not entitled to priority over other tax creditors. If the assets of the bankrupt estate do not suffice to pay all taxes, there should be pro rata payment amongst the tax creditors. (*Re Fountain*, 295 Fed. 873.)

The priority of tax claims applies to general creditors, but not necessarily against mortgages and other liens. Citing a decision of the United States Supreme Court, the United States District Court for the Western District of Kentucky said in the case of *Green River Jockey Club*, 5 Fed. 2d, 259:

"Under this section of the Bankruptcy Act, a valid and subsisting claim of a taxing unit, either national or state, against the bankrupt for taxes due it, is entitled to preference over general creditors, regardless of whether the tax asserted by the taxing unit is made by the law which imposes it a lien on the bankrupt's property or not. But where the statute imposing a tax does not make same a lien upon the property of the bankrupt, such tax, even when asserted by the taxing authority, is not entitled to priority over other valid and subsisting liens."

Over $800,000,000 Borrowing Margin Available for New York State Cities

By WILLIAM P. CAPES
Executive Secretary, Conference of Mayors and Other Municipal Officials of the State of New York

THE cities of New York State are in good financial condition. They are reducing their debt, decreasing their current expenditures, collecting their taxes and balancing their budgets.

None has ever defaulted on any of its bonds or interest charges. Only one city has exceeded its constitutional debt limit, but it will be out of the red within the next year. Two others will have to exercise care in borrowing, for they are close to their limitation. All of the other fifty-seven are well within their limitation. The total net funded debt chargeable against the constitutional limitation of all cities in the state was reduced 9 per cent in 1931. This is the first time in many years that the funded debt has been decreased. New York State cities have an actual borrowing margin of over $800,000,000* and can nearly double their present funded debt without exceeding the 10 per cent constitutional limit. Reports received since January 1 indicate that this margin will be increased this year, since cities are paying off their indebtedness more rapidly than they are borrowing.

During normal periods the average tax delinquency in the cities of New York State is approximately 6½ per cent. Reports received in January show that the average delinquency in all the cities increased less than 1½ per cent in 1931. We have received no disturbing reports since then.

The cost of city government in the state is being reduced. The total increase in the tax levy in all cities in 1931 was less than one-half of one per cent. This was the smallest increase in a number of years. If the cities had not had to pay several millions for old age security, which they had never before been required to expend, and if they had not had to double and triple their expenditures for home and work relief, there would have been a very substantial reduction. Reports received from thirty-five of the sixty cities in the state to date indicate that there will be a substantial reduction in the cost of city government this year, despite the tremendous relief burden which these municipalities have had to carry.

Because of greatly reduced revenues from state-collected taxes, unavoidable deficits in relief expenditures and the efforts of banks and financial institutions to keep their assets liquid, a few cities had difficulty at the beginning of the year to balance their accounts. These difficulties have been surmounted. All cities have learned their lesson. They are no longer waiting until near the end of the year to balance their budgets, but are exercising a strict control throughout the year, so as to avoid deficits and the necessity of borrowing. In other words, they are endeavoring as never before to live within their income, by eliminating waste without curtailing essential activities and services. The unthinking person may interpret such procedure and caution as indicating financial embarrassment. This is responsible for much loose talk and false reports about municipal financial conditions. The real fact is that those municipalities are operating on a sounder financial basis than ever before.

* EDITORIAL NOTE.—This $800,000,000 borrowing margin, it should be observed, covers only the sixty municipalities having the city form of government, and does not include the very much larger number of villages, nor the 62 counties in the state.

Is Municipal Government Expensive?

IN the present agitation for drastic reductions in governmental expenditures—national, state and municipal—two important points of view are neglected, if not forgotten. One relates to the social value of the services rendered; the other to their cost compared with other personal expenditures of citizens.

William Anderson, Professor of Political Science at the University of Minnesota, in an article first published in the January *Minnesota Municipalities*, and widely reprinted in other publications of leagues of municipalities, has clearly and forcefully dealt with these two aspects of the tax problem, particularly with the first mentioned. He stresses the fact that government, instead of being an agency the increased activities of which constitute additional burdens and greater oppression upon the people, is a common means for performing services which either cannot be effectively done otherwise, no matter how important, or which at least are the result of insistent demand by large public groups, including farmers, laborers, business men, the professions and the press. And while the various activities of government thus meet extensive social and group demands, the expenditures involved go primarily to increase the consumption of the products of the country's farms, mines and factories—the very thing most needed in our economic emergency.

As regards the relative cost of governmental services, Dudley C. Meyers, Commissioner of Public Works of Oak Park, Ill., has recently furnished some significant comparisons of the costs of various municipal services with some of the incidental expenditures of the average person. His figures are based upon the 1931 experience of his own community of some 65,000 peoples; and while they are not necessarily typical averages for all cities, they are interesting in regard to the light they throw upon the comparative magnitude of these public expenditures. His data include the following:

The cost per capita per day for water is less than 2c., the price of a postage stamp.

The cost of police service per family per week, 21c., is about the cost of a couple of good cigars.

The cost per week per family for the fire department is about 15c., or the cost of a package of cigarettes.

The cost of removing garbage, ashes and rubbish per family per month, 51c., is less than the cost of cleaning one dress or suit of clothes.

The cost of street lighting per family per month, 34c., is less than the price of one admission to a good movie show.

The cost per family for forestry work per year, 53c., is less than the average cost of an Easter lily.

The cost per family per month for the health department, 8c., is less than the price of a box of aspirin.

The cost per family per month for street maintenance, 48c., is less than the cost of four gallons of gasoline.

The cost per capita per month for playgrounds, 5c., is less than the cost of a jumbo ice cream cone, and the cost per family per month, 22c., is less than the cost of a pound of good candy.

The cost per month per family for the library, 25c., is considerably less than one of the recent best sellers and is less than the Sunday newspaper cost per month.

Efficient Hauling Reduces Disposal Costs

Tractor-Trucks with Drop-Frame Semi-Trailers Having 6-Yard Side-Dump Bodies Used in Cincinnati

ON June 1, 1931, a new waste collection system was inaugurated in Cincinnati, Ohio: This work, which had been done previously by a contractor, was taken over by the city. To facilitate waste disposal, three incinerators with modern equipment were built at strategic points. The central incinerator, located at the city workhouse, has a daily disposal capacity of 300 tons, and the two subsidiary plants, one on Crookshank Road and the other at Dunbar Avenue, have a daily capacity of 100 tons each. The incinerators use no fuel in burning the waste, and operate under a forced draft.

The central incinerator is equipped with two 300-horsepower boilers. The steam generated by these boilers is used for heating the city workhouse, municipal garage, sign shop, and various other buildings on the workhouse premises, as well as for washing all waste collection vehicles.

The Collection Fleet

On May 25, 1931, the Waste Collection Department prepared to put in service fourteen International tractor-trucks pulling semi-trailers with 6-yard side-dump bodies for the collection of waste. The city also used McCormick-Deering industrial tractors in conjunction with the tractor trucks. In the West End section there are many narrow alleys in which the industrial tractors with short turning radius are more practical than the larger trucks. The industrial tractors do the actual work of collection, and when the trailers are loaded they are hauled to a designated point and parked. Empty trailers are waiting ready to be attached to the tractors. The tractor-trucks then pick up the loaded trains, which usually consist of one semi- and one four-wheel trailer, and haul them to the central incinerator, where they are unloaded and returned to the West End for reloading. In some cases these chains are made up of one semi- and two four-wheel trailers.

ONE OF THE COLLECTION UNITS UNLOADING AT THE DUNBAR AVENUE INCINERATOR, CINCINNATI

Night Collection in Hotel and Business Districts

The trucks and trailers are used in collecting garbage and waste from the hotels and downtown streets during the night. There are two collections of garbage and one of bulky waste material each week in the suburbs and less-thickly populated parts of the city.

In handling collection work in the suburbs, the trucks pull one semi- and one four-wheel trailer. The load of this combination approximates 22,000 pounds, and the trucks average 60 miles a day. Some of the longer hauls measure as much as 10 miles to the incinerator.

Time Studies

The dumping time of the various collection units was checked at the incinerator. A straight dump truck was timed from the moment it entered the incinerator, dumped its load and left. It showed that 4½ minutes was required. A similar check on the tractor-truck with two loaded trailers showed that but 3 minutes was necessary for this same operation. In unloading the dump trucks, it is necessary to maneuver them into dumping position, as they dump through the tail-gates. With the tractor-trucks and trailers, which have side dumping, it is only necessary to draw them alongside the pit and tip the bodies.

ONE OF THE FLEET OF TRACTOR-TRUCKS AND DROP-FRAME SEMI-TRAILERS COLLECTING REFUSE IN CINCINNATI

Details of Brick Pavement Construction

By **H. G. SOURS**
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A SECTION OF COMPLETED CONCRETE WITH LONGITUDINAL AND TRANSVERSE JOINTS

BRICK pavements have been laid on various types of base courses, both flexible and rigid. In the southern section of the country especially, brick surface courses have been very successful on such foundations as natural sand, Florida limerock, crushed slag, crushed stone, chert and gravel. In the northern parts of the country, brick pavements have given satisfactory service on waterbound and bituminous macadam base courses, well-drained gravel, and, in a few instances, on hot mixed black base. In the steel manufacturing districts there are a number of installations on compacted granulated, water cooled, blast-furnace slag bases.

Concrete is the material now in most general use as the foundation course. In most instances, plain concrete has been used, although in several localities steel reinforcing is included. There is some difference of opinion among engineers as to whether a concrete of relatively rich or lean cement content should be used. Some favor a lean mix and greater slab thickness, the argument in favor being that the tensile strength is less and that, although the cracks which form will be more numerous, they will be finer, which will not permit the filtering-in of cushion material. Many engineers, in the case of bad subgrade conditions, favor a richer concrete mix for the base course and the use of reinforcing. The rich base is favored more in the North, where weather conditions may damage a lean mix. The trend seems to be to use richer concrete for base courses on state highway construction than in municipal work. This is probably due to the fact that in municipalities there is more thorough drainage, and satisfactory subgrade conditions.

Surface unevenness caused by cushion material filtering into base cracks has recently brought about considerable sentiment in favor of designing concrete bases with transverse and longitudinal joints providing for contraction and expansion. The contraction joints are usually of the weakened plane type filled with bituminous material and covered with a strip of burlap; the expansion joints are of the open type sealed at the bottom with bituminous material and covered with a strip of light-gage metal. This design provides for crack control as well as stresses in the slab, a matter which has been generally neglected in concrete base design.

It is customary to use a concrete base course thinner under a vitrified brick top course than for a single concrete pavement slab. The thickness and strength should always be sufficient to safely meet conditions. It is false economy to attempt to save money by placing a high-class top on an inadequately designed base.

The smoothness requirement for surface finish of base courses of all kinds in modern specifications is practically the same as for the surface of a pavement; ¼-inch in 10 feet is a common specification. Finishing machines are now generally required.

In 1930 an experimental section of metal base, 150 feet in length, with a brick surface course, was installed near Springfield, Ill. Corrugated sheets, No. 10 gage, and plain sheets ¼-inch in thickness, were used. The construction proved to be weak structurally under a concentrated traffic test. The failure was partly due to the fact that stock sheets were used and spot-welded in place. Many of these welds were broken. When the section was removed, in September, 1931, after being about a year in service, the sheets with the corrugations longitudinal and the plain sheets did not have permanent deformations. Tentative conclusions from this test are that a metal base properly designed would probably be too expensive in most instances for practical consideration.

A 2-INCH OPEN EXPANSION JOINT
Covered with an 8-inch plate of 16-gage galvanized metal, which is in turn covered with a 12-inch strip of burlap sealed in place

The Bedding Course or Cushion

When it was the practice to construct base courses with an irregular and rough finish, the bedding course was used to take out the inequalities and provide a smooth surface on which to lay the brick. There was always considerable variation in depth, which often resulted in a shifting of the cushion, with subsequent effect on the brick surface course. Where bituminous fillers were used, there was also a likelihood that heavy trucks would in course of time disturb the surface where the cushion was deep. A present-day brick pavement is designed with a much thinner cushion course and of uniform thickness. This is possible because modern specifications require the base course to be finished practically as smooth as the surface of the road. The bedding course should not be thicker than 1 inch, and preferably ¾-inch.

Where resurfacing is done with brick, the old pavement used as a base is usually more or less uneven. Excessive variation in the surface of the old pavement may be corrected by leveling up with bituminous binder material or by applying a slush coat of cement grout. Some variation in depth will still remain under these conditions unless the entire surface is leveled, an operation which would be rather expensive.

The material which has been most frequently used is sand, with a certain amount of loam permitted. In the old grout-filled pavements the defects, due to cracks in the base and the shifting and settling of the bed, did not show up to any extent, owing to the fact that the brick were bonded into a slab which bridged over such places. The bituminous filler, which takes care of expansion and has eliminated the unsightly cracks which develop in grout-filled surfaces, has brought with it some of the defects above mentioned. In order to eliminate these faults, it is now generally admitted that crack-controlled, smooth bases are essential with all cushion material, and especially with sand. Many engineers are now opposed to the use of sand, since it seems to be safe only so long as it remains in a damp condition.

Cement-sand, another bedding material, while it forms a bed which will not shift or flow into cracks, is not entirely satisfactory, because it becomes too rigid and is more or less of an anvil with traffic acting as the hammer.

In localities where granulated, water-cooled slag can be secured economically, this material is ideal. It is highly compactible and has certain cementing qualities which in time will form a bed which will remain in place but will not develop the metallic hardness of sand-cement. It can be rolled with a power roller and is especially adapted to resurfacing where the depth of the bed is variable. Granulated slag retains a certain amount of moisture for some time after coming from the plant, but it should be sprinkled on becoming dry, to insure compaction and cementing action.

Fine stone and slag screenings have been used successfully, for they have cementing qualities which will bond them together; this material should also be sprinkled before rolling, to insure compaction and cementing action.

A development of recent years is the use of a sand mastic mixture for the bedding course. This type of cushion is required in the latest specifications of the Illinois Highway Department and has been used on the brick resurfacing projects constructed this year in that state. Other recent projects on which a bituminous mastic cushion has been used are in Olean and Auburn, N. Y. It was also used in Mattoon, Ill., in 1923-24 in the proportions of 96 per cent sand and 4 per cent by weight of light refined tar. A recent examination showed these pavements to be in excellent condition. Samples of the cushion were taken from the pavement and subjected to laboratory tests. A visual examination showed the material to have the appearance of dark-brown to black sand, well compacted but not cemented, and it was decidedly damp. The laboratory extraction tests showed that only about 1.16 per cent of the original 4 per cent of tar remained. Both tar and asphalt cutbacks as well as straight oil asphalt have been used in making mastic cushion. On the Illinois work 6 to 7 per cent of bituminous material by volume seemed to give best results. The mastic was mixed in paving mixers and in some cases in an asphalt plant. Best results were obtained in the asphalt plant, owing probably to better drying facilities. Difficulty was encountered in some cases in properly rolling the material, due probably to the mixing being done too far ahead of actual use, this having permitted some of the volatile solvents to evaporate.

Based on the Mattoon, Ill., experience, it might be well to give serious consideration to the use of a non-volatile residual oil which would permit the mixing and manipulation of a mastic material at air temperatures. Such a material could be readily screeded and thoroughly rolled; it would not bind together, but would undoubtedly remain in a condition similar to that found on the Mattoon work after having been in place eight years. In the case of new bases, crack-controlled and finished smooth, there would probably be very slight danger of filtering. In the case of resurfacing where variable depth is encountered, the majority of the cracks have already developed and could be protected by sealing and covering. If the material was thoroughly compactible, there should be no danger of unevenness developing on account of variable depth. Further research and experimental work along this line should be carried out.

The striking off and preparing of a uniform bed is of extreme importance in the laying and maintaining of a

A COMPLETE PICTURE OF BRICK PAVING OPERATIONS
This shows the granulated slag cushion, the brick rolls, the 10-ton tandem roller, and the tank truck of filler in the background

smooth brick surface. It would be well if specifications should prescribe definitely the type of screed or templet which should be used; it is just as important as certain other types of equipment which are definitely specified. Such a screed should be designed so as to be substantial, and the screed board itself should be mounted on carriers 10 feet long, which should be equipped with rollers operating on the curb. In case of a wide pavement, the screed could be half-width and disc wheels could be used on the one end which would roll on the concrete base, provided it was smooth, otherwise the rollers could be used operating over flat wood or metal forms lined up uniformly. Such a screed should be of all-metal construction, with the exception of the board itself, which could be shod with an angle-iron. The use of a long straight-edge on the finished cushion, and the correcting of all unevenness in the bedding course before laying the brick, have been found to be very helpful.

The Brick Course

The depth of brick course in modern design is less than was formerly used. Until comparatively recent years, the minimum depth of the brick course was 4 inches and the brick were laid with their longer cross-sectional demension vertical, or on edge. Experiments conducted by the U. S. Bureau of Public Roads on a brick-paved circular track at Arlington demonstrated that, when properly supported, brick down to 2½ inches in depth will withstand heavy traffic. The depth of vitrified brick surface course in most common use is 3 inches. The brick are now laid with the shortest dimension vertical, or flatwise. This has served to secure a more satisfactory riding surface and, because fewer brick units are required, and there are fewer joints to fill, with decreased depth, has resulted in lowering the cost of brick pavements.

The initial simplification project of the U. S. Department of Commerce, in its effort to eliminate waste in industry, was inaugurated by the producers of paving brick in 1921. As a result of the work of the Permanent Committee on Simplification of Variety and Standards for Vitrified Paving Brick, on which the leading engineering organizations are represented, the Department of Commerce has recognized the following types and sizes:

Plain wire-cut brick (vertical fiber lugless)
- 2½ x 4 x 8½ inches
- 3 x 4 x 8½ "
- 3½ x 4 x 8½ "

Repressed lug brick
- 4 x 3½ x 8½ inches

Wire-cut lug brick (Dunn)
- 4 x 3½ x 8½ inches
- 3 x 3½ x 8½ "

The trend is toward the increased use of a lug type of brick which will insure positive separation of the joints and permit more thorough penetration of the filler. The lug brick has always been used more extensively in the East and, according to recent reports, will be required in certain sections of the West where lugless brick has heretofore been used. A type of lug brick introduced recently, which is meeting with much favor, is known as the wire-cut vertical fiber brick with lugs. This differs from the wire-cut lug brick in that the wire-cut, instead of the die, side is in the surface. Difficulties in manufacturing this type of brick have been overcome and the wire-cut surface provides an additional non-skid feature. If this type of brick proves satisfactory, it would be possible to standardize on it, which would result in further simplification of varieties. This would contemplate a standard brick with the same surface dimensions, the only variation being in the depth. It has been suggested that three depths—2½, 3, 3½ or 4 inches—would answer all purposes. It will take several years before it will be known whether such a development will be the result of the introduction of the wire-cut brick with lugs.

The workmanship on laying brick pavements has been improved materially through requirements of the modern brick paving specifications. The Illinois and the Pennsylvania Highway Department specifications require a smoothness of ⅛-inch in 10 feet. There is no reason why the brick pavement should not be constructed as smooth as any other type, for the surface contour can be readily adjusted during construction and later, after the pavement is under traffic.

Types of Fillers

The fiiller now being used in practically all brick paving construction is a bituminous material—in a great majority of the cases, straight asphalt. Portland cement grout, which was formerly used as a filler on all high-grade construction, is still required to some extent for special work, such as street-car tracks, gutters and parking strips. In such cases, there is usually provision made for expansion. The reason that a bituminous or flexible material has been almost universally adopted for filler is that difficulties incident to temperature changes, such as internal stresses, occasional "blow-ups" and unsightly surface cracks, have been obviated by its use. In addition, if properly constructed, the joints are sealed against the entrance of moisture, and the edges of the brick are protected.

Unsatisfactory fillers have called for considerable study during the past two years. The most serious trouble has been bleeding of the filler during hot weather, and slipperiness caused by some of the filler remaining on the surface for a period of time after application.

Reference has been made to the coating of the surface with certain materials which would prevent adhesion of

A COMPLETED 40-FOOT BRICK PAVEMENT ON AN 8-INCH CONCRETE BASE

With flush curbs and 10-foot shoulders surfaced with crushed stone. The construction is on an 80-foot right-of-way

the filler. This has proved to be effective, but great care should be taken that none of the material creeps down along the sides of the brick and prevents adhesion where it is needed. The use of coarse grit, not sand, rolled into the surface immediately after application has been found to be of considerable value in preventing slipperiness, and it also peels off the surface in a better manner. The tendency seems to be in favor of a harder filler; the soft fillers which have been used during recent years were to some extent the result of necessity brought about by the use of a lugless brick, which has now been largely discontinued. The harder fillers seem to hold their place satisfactorily; they do not soften enough to cause any trouble and during cold weather the brittle excess soon chips off the surface.

Following are two standard specifications recommended by the American Association of State Highway Officials for asphalt filler:

TYPE A

General Requirements..—1. The asphalt filler shall be homogeneous, free from water, and shall not foam when heated to 177° C.

Properties.—2. The filler shall conform to the following requirements:

Flash point, not less than 200° C.
Softening point, not less than 65° C. to 100° C.
Penetration, 0° C., 200 g., 1 min., not less than 10
Penetration, 25° C., 100 g., 5 sec., 30 to 50
Penetration, 46° C., 50 g., 5 sec., not more than 110
Loss on evaporation, 163 ° C., 5 hours, not more than 1.0 per cent
Penetration, 25° C., 100 g., 5 sec., on residue from evaporation loss (basis of original penetration at 25° C., 100 g., 5 sec.) not less than 50.0 per cent
Ductility, centimeters, 25° C., not less than 3
Total bitumen (soluble in carbon disulphide) not less than 99.0 per cent
Proportion of bitumen soluble in carbon tetrachloride, not less than 99.0 per cent

TYPE B

General Requirements.—1. The asphalt filler shall be homogeneous, free from water, and shall not foam when heated to 177° C.

Properties.—2. The filler shall conform to the following requirements:

Flash point, not less than 200° C.
Softening point, 60° C. to 75° C.
Penetration, 0° C., 200 g., 1 min., not less than 20
Penetration, 25° C., 100 g., 5 sec., 50 to 60
Penetration, 46° C., 50 g., 5 sec., not more than 160
Loss on evaporation, 163° C., 5 hours, not more than 1.0 per cent
Penetration, 25° C., 100 g., 5 sec., on residue from evaporation loss (basis of original penetration at 25° C., 100 g., 5 sec.), not less than 50.0 per cent
Ductility, centimeters, at 25° C., 10 to 30
Total bitumen (soluble in carbon disulphide), not less than 99.0 per cent
Proportion of bitumen soluble in carbon tetrachloride, not less than 99.0 per cent

These specifications are typical of the two classes of filler discussed above. It is believed that Type A is to be preferred for practically all purposes. The Ohio Highway Department has recently changed from Type B to one very similar to Type A using a softening point at 170° to 180° F.

The following specification was adopted by the American Society of Municipal Engineers at their meeting in Pittsburgh in October, 1931:

(A) Asphalt. Filler Description.
- (a) The asphalt filler shall be homogeneous, free from water, and shall not foam when heated to 200° C. (392° F.)
- (b) Flash point (Cleveland open cup), not less than 200° C.
- (c) Melt point, ring and ball. Min., 75° C. (167° F.); Max., 85° C. (185° F.).
- (d) Penetration at:
  - 25° C. (77° F.), 100 gr., 5 sec. Min., 30; Max., 45
  - 0° C. (32° F.), 200 gr., 60 sec. Min., 10
  - 46.1° C. (115° F.), 50 gr., 5 sec. Max., 90
- (e) Ductility at:
  - 25° C. (77° F.). Min., 4 C. M.
- (f) Loss at:
  - 163° C. (325° C.), 3 hrs., not more than 1 per cent
- (g) Total bitumen (soluble in carbon disulphide). Min., 99.0
- (h) Per cent of total bitumen soluble in carbon tetrachloride. Min., 99.0

This specification practically comes within the limits of Type A and may be classed as a hard filler. It would be well to raise the flash point to 240° C.; a filler having a high melting point must necessarily be heated to a high temperature in order to insure proper flowing into the joints. With an low flash point this would be difficult to do without damaging the filler.

A mastic asphaltic mixture, consisting of about 25 per cent of sand or fine mineral aggregate, has been used successfully in the cities of New Orleans, La., and Jacksonville, Fla. The aggregate content of course increases the stability of the filler and decreases its tendency to bleed or flow at high temperatures. It should be noted that both of these cities are located in the far South. Trinidad Lake asphalt, which contains from 25 to 35 per cent of mineral, was used recently in Richmond, Va., on a small area. According to reports, the results were very good.

Experimental sections of brick pavement were filled with emulsified asphalt by the Ohio State Highway Department. The joints were first swept full of a very coarse sand, and the asphaltic emulsion was then applied cold with a truck pressure distributor. Another experimental section was filled with regular asphalt filler to within ¾-inch from the top of the surface; the following day coarse sand was brushed in and the filling completed with emulsion. Some excellent results have been obtained with emulsions in refilling jobs, especially where the old filler was still in place in the lower half of the joint. It is quite advantageous to use emulsions in emergency repairs, especially during seasons of the year when damp or cold weather is encountered.

Applying the Filler

Even with an ideal filler the results will be unsatisfactory if there is poor workmanship in its application. The asphalt filler should be heated sufficiently to insure full penetration of the joints without passing the danger point, and a thermometer should be required on the heating kettle or tank. The filler should be forced into the joints as soon as possible after it is applied to the surface of the brick. Asphalt that has cooled will congeal and there will only be partial penetration into the joints, which should be completely filled. In addition to this, cool asphalt will spread out over the surface, causing a rough pavement and slippery condition. An application device that has come into use in recent years has greatly improved the application of asphalt filler. It is known as the wheeled squeegee, or buggy, and consists of a small tank mounted on wheels, with a discharge pipe and curved flexible squeegee attached. The asphalt is discharged direct from the heating tank into the squeegee bucket, and its flow onto the pavement is controlled with a valve by the operator. It cools very slowly in the small tank and is raked into the joints immediately after it flows out onto the brick. A number of recent specifications require this method of application. Another recent development is the use of truck distributors in transporting the filler from the railroad tank cars to the site of construction. One some projects the asphalt has been applied under pressure direct from the truck distributor and scraped into the joints with hand squeegees. The use of the truck distributor insures that the filler is maintained at the required temperature.

In many cases, owing to the fact that the application of filler is about the last operation in connection with the construction of a brick pavement, the work is performed

during cold weather. This has frequently been the reason for poor results. Modern specifications require that the temperature of the brick be raised to not less than 80° F., immediately before applying the filler by the use of surface heaters or similar devices when the temperature of the brick is below 50° F. This method is not expensive and will insure satisfactory results.

Modern specifications also specify a minimum thickness of the surplus asphalt remaining on top of the brick. This is usually limited to 1/32-inch. Another method that has been used to a limited extent is to coat the surface of the brick with a material that will facilitate the removal of the surplus asphalt after the application. Materials that have been used and proposed for this purpose are ordinary whitewash, light oil and sodium silicate.

Relaying, Replacement and Resurfacing

Vitrified paving brick that have been in use for as long a period as thirty years are being taken up and relaid. Frequently, the old brick are relaid on the existing foundation after it has been repaired and reinforced. In other cases the brick have been transferred and relaid in another location. As most paving brick were originally laid on edge, there is frequently a 100 per cent recovery, when they are relaid in the modern manner. Among the cities where salvaged brick were relaid in 1931 and began a new period of service, are Pittsburgh, Pa., Albany, Ga., Ashtabula, Alliance, Mt. Gilead, Uhrichsville, and Zanesville, Ohio. Pavements that have been constructed of brick reclaimed from old pavements have the appearance of new pavements and are striking illustrations of the long life and salvage value of a properly manufactured vitrified paving brick.

One of the most important uses which are being made of paving brick is the resurfacing of old pavements that are beginning to show signs of weakness and deterioration. This resurfacing is usually performed in conjunction with the widening of the old pavement. In case the widening is slight, from 2 to 4 feet, it is usually done by constructing header curbs equivalent to the extra width and resurfacing of the old pavement. In case the widening is sufficient to warrant the construction of any base, the edge of such new base should be anchored under the edge of the old pavement. Careful inspection of the condition and value of the old pavement should be made, and all sections that are in doubt should be reconstructed. It is considered to be better practice to resurface an old pavement before it has gone beyond the danger point of salvaging, rather than to wait until it has deteriorated to such an extent that there is serious doubt as to its value as a base.

The use of brick of contrasting colors to mark traffic lanes, parking strips and outline directional and warning signs has appealed to some paving authorities and traffic officials. This kind of marking does not become obliterated and require renewal. The new bridge over the Maumee River at Napoleon, Ohio, completed in 1930, has the word "Napoleon" and a north point boldly outlined on the brick pavement in a light-colored brick against the darker-colored brick background. The purpose of this marker is to act as a guide to air travel.

ACKNOWLEDGMENT.—From a paper presented at the Eighteenth Annual Road School at Purdue University, Lafayette, Ind.

Unemployment Relief Combined with Economy in Street Construction

An Outline of the Methods Employed in Liverpool, N. S.

THE town of Liverpool, Nova Scotia, with a population of some 2,700, has about 10 miles of gravel streets. For many years it has been the practice to treat these streets with gravel and calcium chloride. The dust was laid, but each year pot-holes developed, maintenance increased, and there was much mud. In June, 1931, through that area as elsewhere, there was a great deal of unemployment. The local officials decided that something must be done to relieve these conditions and at the same time, if possible, improve the town. They realized that from the point of view of finances, the town must have value in kind for every dollar spent.

At a Council meeting it was suggested that, in view of the comparatively limited traffic and the desire of the community to spend as little as possible, the town hire a crushing plant, other necessary equipment, purchase the binder and use local unemployed men to put down a 3-inch asphalt wearing surface. Most of the main streets of the town had good gravel bases from 2 to 3 feet deep. A public meeting authorized the spending of the necessary funds, and work was begun immediately.

Preparation of Road for Resurfacing

After the second-hand rented crusher had been set up, convenient to the town, the stone was brought in by small farmers from the surrounding communities, and by unemployed men, in ox teams, horse wagons, trucks and many other kinds of conveyances. The stone was bought by the town for $1.00 per cubic yard, the only stipulation being that the rocks must be clean and hard and of a suitable size to crush. Colas, an asphalt emulsion, was purchased for binder, and a motor-driven pressure distributor and steam rollers were rented from the Brantford Carritte Company, Ltd., which furnished a foreman to supervise the work and assist the local street superintendent.

After the old surface had been scarified and reshaped with the town grader, the base was thoroughly rolled, and the 1¼- to 2-inch crushed rock was spread evenly to a

depth of about 2 inches and again rolled. Then about ⅝-gallon per square yard of Colas emulsion was applied lightly, covered with dry stone and rolled, and a second 1¼-inch layer of rock was spread and rolled. This layer was then coated with ½-gallon of Colas to the square yard and rolled and blinded with ½-inch stone. All the work was seal coated with ¼-gallon of the emulsion to the square yard and covered with screened clean gravel from ⅜-inch down to coarse sand.

A model F. J. Etnyre pressure distributor with a 400-gallon insulated tank loaded the Colas from tank cars on the railway siding, and distributed the entire quantity, with no further heating of the material. A second seal coat was recommended, but it was decided to let the wearing surface take traffic for one year, so as to thoroughly close it up and allow any weak spots to be repaired. The second seal coat was applied early in the spring of 1932 at a cost of about 9 cents per square yard.

Extent of Work Increased

It was the original intention to treat 10,000 square yards of roadway in this manner, but the town increased the area to 25,000 square yards because of the advantages, both financial and practical, for continuing the work with all the equipment on the job.

The general appearance of the work upon completion was good except where there were sunken concrete crossings, which had not been removed because of the extra expense involved. The surface seemed to improve with traffic and was not slippery in wet weather.

During the summer the town employed a man to clean these streets, and many visitors as well as residents noted the improvement in the appearance of the town.

The 25,000-square-yard job was completed for less than 40 cents per square yard. When it is considered that it was done as an unemployment relief measure, that the men worked in shifts, the crews changed frequently, giving every one a share in the wages, and the rock was purchased in small lots from any one who could deliver it, the town is to be congratulated on its efforts. It secured an economical wearing surface at a nominal cost and furnished labor for a large group of unemployed. The mud and dust of the old gravel roads has been done away with at a little more than the annual expense for dust preventives and other maintenance.

The Twelfth Man—The Public Servant

THAT one person out of every twelve in the United States is a public official or employee—national, state or local—was the estimate of John H. Finley, Associate Editor of *The New York Times*, as elaborated in Dr. Finley's picturesque way on April 5, in his introduction, over a nation-wide network of the National Broadcasting Co., to the Government Series sponsored by the National Advisory Council on Radio in Education. To quote two characteristic paragraphs on this twelfth man and those whom he serves:

"He sweeps the streets of the city. He is pontifex of the country roads. He lights the lamps when the natural lights of heaven go out, and extinguishes the fires of the earth. With one hand he gathers our letters of affection or business, and with the other distributes them in the remotest cabins on the mountains. He weighs the wind, reads the portent of the clouds, and gives augur of heat and cold. He makes wells in the dry valleys and fills the pools with water. He tests the milk before the city child may drink it. He tests and labels the food of the stores and shops; he corrects false balances and short measures; and he keeps watch over forest and stream; he gives warning of rocks and shoals to men at sea, and of plague and poison to those on land. He is warden of fish and bird and wild beast; he is host to the homeless and shelterless; he or she is guardian and nurse to the child who comes friendless into the world, and he is chaplain at the burial of the man who goes friendless out of it. He is assessor and collector of taxes—treasurer and comptroller; he or she is the teacher of twenty million children, youths, men, and women. He or she is public librarian and maker of books, overseer of the poor and superintendent, doctor, nurse, and guard in hospital, prison, and almshouse; coroner and keeper of the potter's field. He is mayor, judge, public prosecutor, sheriff. He is a soldier in the army and a sailor in the navy; general, admiral, legislator, justice, member of the cabinet, governor, and president. Such is the definition of the 'Twelfth man.' . . .

"It has been said that 'democracy is always dreaming of a nation of kings'; kings in the sense of men who are monarch of themselves at least, clear-visioned, strong-willed, clean-virtued sovereigns. It is of that dreaming, of that longing, that the elders have educated their youth in the hope that each may be a king in his own right. But in another sense the 'kings' of democracy are these 'twelfth men' anointed, appointed, not by some far-seeing prophet living apart from the people, but selected by the hurried and often fickle desires of men in the midst of the struggle for existence. The casting of votes for such kings, in rough boxes in tailor-shops or barber-shops or like places, does not impress one with the importance and sacredness of the franchise. And yet the timid journey of the prophet Samuel to a village in Judea to anoint the son of Jesse to kingship was not a more significant pilgrimage than is that of a mechanic, merchant, or lawyer, who goes into the booth to cast his vote for the twelfth man in a republic."

Local Construction Inventories Are Recommended

"THE possibility of anticipating future building requirements more dependably through improved statistics offers great hope for the future of the building industry," states the first publication of the National Conference on Construction, a report on "Local Construction Inventories."* "In Washington, for instance," to quote further, "when mortgage men decided not to advance further funds, on the assumption that the city was over-built and that about 10 per cent of the houses were standing idle, a house-to-house survey was made, which revealed a vacancy of approximately 2½ per cent. As a result, arrangements were made to estimate demand somewhat along the lines suggested in the following pages, and money was soon made available by bankers after this reassurance. Supply was kept within the limits set by demand, and values kept relatively stable." Other examples are given of the use of such studies in forecasting market values as well as demand.

* See the Department of Municipal and Civic Publications in this issue.

Ten Essentials of Successful Purchasing in Government

By H. E. RUSSELL
Purchasing Agent,
County of Los Angeles, Calif.

The Acrostic of Successful Purchasing

S pecific	P olicies
U niversal	U nderstanding
C entralized	R esponsibility
C ompetent	C ompetition
E stablished	H armony
S ales	A bility
S implified	S ystems
F earless	I ntegrity
U nbiased	N eutrality
L egal	G uidance

SUCCESS in purchasing for government depends, the writer believes, upon the following ten factors which, for the most part are subject to determination and application by the purchasing agent:

SPECIFIC POLICIES.—In establishing the policies of a governmental purchasing department, the first thing to consider is the laws under which you must operate, obviously for the reason that you cannot establish a policy contrary to the dictates of that law. Policies of personnel, duties of assistants, assignments of special duties, office procedure, method and time of interviewing salesmen, buying methods—whether by bid, open purchase, or term contract; whether or not bids will be considered after the appointed hour of closing—all must be predetermined. All hit-and-miss methods should be abolished, and specific policies for every operation should be written out, adopted, and published to all the employees and vendors concerned. This can be done through the medium of a manual, which does not necessarily have to be written all at one time, but can be gradually made and added to by issuing letters of instruction, written on punched sheets for a ring binder, numbered in sequence and indexed, which afford ready reference to any subject.

UNIVERSAL UNDERSTANDING.—The really successful purchasing agent must understand economic conditions, both domestic and foreign; he must know the condition of the general commodity market; he must understand commodity charts, business forecasts, and price averages; he must know the various sources of supply and each supplier's reliability; he must understand the use for which the article is purchased, its construction, and its value; and he must understand the needs, operating conditions and problems of the using department.

On the other hand, the vendor, or supplier, must have a thorough understanding of the buyer's requirements, either by specifications, or by adequate description, of each article; he must have an understanding as to how bids are to be made: whether alternate proposals will be considered; whether an affidavit, or a surety bond, is required; when and how deliveries are desired; and when payment is to be made.

Using departments must have a thorough understanding as to the proper method of requesting supplies—how to properly receive and receipt for them; the necessity of adhering to standardized commodities as far as possible. Universal understanding might be defined as an extensive and accurate knowledge of requirements, conditions, relationships and responsibilities of all parties to a transaction.

CENTRALIZED RESPONSIBILITY.—The purchasing agent, as head of the department, should be responsible for the proper and efficient conduct of every employee. If something goes wrong, he should not try to "alibi" or to shift the blame. The responsibility is centralized in him, as head, and should be assumed without question. Each employee, however, should be assigned certain responsibilities and held to account for them, but in such a manner as to inspire confidence, individuality, and initiative. No matter how meager the task he may be called upon to perform, each employee should be encouraged to assume responsibilities other than those specifically assigned, by constructive criticism rather than by destructive faultfinding. Suppliers also have certain responsibilities, which should be firmly and tactfully insisted upon.

COMPETENT COMPETITION.—Political bodies, required by law or charter to purchase on formal bids, were originally compelled to accept the lowest bid without taking into consideration the competency or responsibility of the bidder. However, the fallacy of such a law has been realized and in most cases the wording has been changed to read, "the lowest responsible bidder." While it is rather difficult to establish the fact that a firm is not responsible, it does provide means of elimination where such facts are known, and at the same time assists in stimulating competition from higher type firms. The use of rejection reports by the receiving agency, on which each rejection is recorded, and giving the reason therefor, materially assists in determining which firms are constantly endeavoring to deliver merchandise of inferior quality. These reports are sent to the purchasing department each week and recorded under the firm name, thus establishing a definite record which can be used to advantage when necessary.

Personal contact between buyer and seller is essential to the successful operation of a purchasing department. The purchasing agent should be careful not to lose this contact even if the law does prescribe certain procedure that must be followed, but which, if adhered to literally, could result in a purchasing department's becoming nothing more than a clerical staff operating in a routine way and shut off from contact with the outside world.

ESTABLISHED HARMONY.—One of the most ancient examples of harmony is that of the two oxen yoked together, pulling in the same direction at the same time. Team work within the department, coordination with other departments, consideration of vendors' rights, and courteous treatment to salesmen and the public, are all vitally important. Salesmen, in many instances, are kept waiting an unreasonable length of time, or are refused an interview without being given a reason. This should be avoided, for it materially detracts from the feeling of goodwill which should exist.

SALES ABILITY.—Sales ability is usually not thought of as a necessary requisite in purchasing. Yet your entire department should be a sales organization. The customers are your governing body, the various departments you serve, the firms with whom you do business, and, last but not least, the stockholders of your institution, or, in other words, the taxpayers. The commodities that you must sell are yourself, your organization, your departmental policies, goodwill, and confidence.

Little progress is obtainable without the confidence and

support of your superiors, the cooperation of using departments, and the confidence of those upon whom you depend for quotations and service. The unsuccessful salesman can be informed of his misfortune in a pleasing manner, wishing him better luck next time and assuring him of your appreciation for his time and endeavor. The disgruntled taxpayer—and I say disgruntled because you seldom see him unless that is the case—is entitled to a courteous hearing, and, if possible, a satisfactory solution to his particular problem or complaint. While it may seem a trivial matter to you, it may be a paramount issue to him. Perhaps it is his first experience in seeking information from his government and you may be the only public official that this particular taxpayer contacts, with the result that the whole administration is judged by the treatment accorded him in your department. We cannot, therefore, be too painstaking in selling not only our own department, but governmental administration as a whole.

Simplified Systems.—While it is necessary, and highly desirable, to establish controls and methods of procedure, care should be used not to over-systematize a purchasing department lest we find ourselves in the position of the merchant who succumbed to the influence of a high pressure salesman and purchased a very elaborate and complicated sales and cost accounting system. A year later the salesman happened to be in the same territory and dropped in to inquire how the system was working. "Fine," answered the merchant. "And how is business?" asked the salesmen. "Well," said the merchant, "we have been so busy operating the system that we have had very little time to devote to business." Certain records are very essential, but a careful analysis should be made of what each record is to accomplish, its value to the principal function of the department, and its cost of maintenance.

Fearless Integrity.—To my mind there is no walk of life wherein integrity is of such vital importance as in the public purchasing department. Whatever the arguments in justification of reciprocity buying in the industrial world, certainly it has no place in a governmental purchasing office. Its use would be of political nature only, and if we are to continue to progress from the old spoils system as we have in the last few years, we cannot guard too closely the necessity of establishing and holding the confidence of our sources of supply. Too high a plane of business ethics cannot be maintained, and integrity is the very foundation of business ethics.

Unbiased Neutrality.—In the purchasing department we encounter all types of men and it is only natural that certain types appeal to our personality more strongly than do others and we form not only acquaintances, but friendships, from these contacts. Constant care should therefore be used not to let these friendships bias our minds, or influence our decisions, in the placing of orders. Restricted lists of vendors to whom we send requests for bids should not be permitted, but new sources of supply should be constantly sought and encouraged to participate in these quotations. The elimination of friendship in purchasing is by no means an easy task and only by persistent endeavor can we combat this natural and human influence.

Legal Guidance.—Each type of political subdivision has different laws under which it operates. In California the state purchasing department operates under the general laws and the political code of the state; counties operate under the political code and, in some instances, under a charter and rules ordinance; cities are operated largely under charter regulations, although there are sections of the political code which affect all branches, as for example Section 3235, which prohibits the state and any political subdivision thereof from purchasing any product of Mongolian labor.

Each division has its legal advisor, which in the state is the attorney general, in counties the county counsel or the district attorney, and in cities the city attorney or corporation counsel. Since there are many legal restrictions governing public buying, it is too much to expect the purchasing agent to decide all legal questions involved in his work. He should keep in constant contact with his legal advisor, referring to him for decision all questions in doubt.

These ten factors, set up in the form of an acrostic, spell SUCCESSFUL PURCHASING. This will be the assured result for any purchasing agent who faithfully observes and practices this decalogue of principles.

Mosquitoes—What Kinds Have You?

HAVE you the *Aedes sollicitans*, which breeds in brackish water and travels long distances with light breezes? Or some other breeds of the species of *Aedes* which also are travelers from the temporary wooded pools where they originate and which become intermittent nuisances and affect property values? This latter problem should be tackled by the community, the county, or the group of counties affected, as is now being done in New Jersey, Massachusetts and some other states.

Or perhaps you are keeping up the supply of *Culex*, or, in the South, of *Stegomyia*, both of which flit gleefully from the rainwater in discarded tin cans and other back-yard containers to follow us into our houses.* *Culex* also breeds in dirty water and in water heavily charged with house waste or sewage, and sometimes ranges as far as two miles from such a prolific source. Even though the water is not in sight, if it is accessible it will be reached by mosquitoes, sometimes to the extreme of going down a rainwater pipe that leads to a cistern.

It is an easy matter for communities having a simple mosquito problem of this nature to solve it if a sufficient number of people get together and eliminate open water containers exposed to rain, and also install proper sewage disposal. The more extensive sources of these pestiferous insects are usually publicly controlled, as the result of the work of state health departments and civic associations in arousing the interest of municipal officials. Drainage of breeding places and oiling of water surfaces and catch-basins are regularly attended to in a large number of towns by men employed exclusively for mosquito eradication.

In considering the question of mosquito elimination in any locality, the first step is to determine the kinds of mosquitoes present. Assistance in identifying the species can be obtained from the local health officials, the state entomologist, the state board of health, the Bureau of Entomology of the Department of Agriculture, or the U. S. Public Health Service. The next step is to make a survey or inspection to determine how many natural sources there are and what it will cost to drain them, if practical, or to reduce their number and keep the other breeding places under control by treatment with oil or larvicides.

To clinch it all, many towns have adopted the standard mosquito ordinance, which makes it a misdemeanor for any property owner or tenant to allow mosquitoes to breed on his premises. Copies of this ordinance may be obtained from your state health department or from the U. S. Public Health Service, Washington, D. C.

* See page 127 of the June, 1931, issue of THE AMERICAN CITY, showing how the local mosquito nuisance has been strictly dealt with by ordinance in the city of Watertown, N. Y.

Grade-Crossing Control and Grade-Separation Programs

By **WILLIAM J. FOX**
Chief Engineer,
Los Angeles County
Regional Planning Commission

THE most casual survey will indicate that we have greatly erred in permitting so many grade crossings. Crossings exist at many hazardous locations where they are not needed, and a great many new ones are constantly being opened. Little or no effort has been made in the past to close unimportant crossings. The frequency of grade crossings should correspond to the public convenience and necessity, with due regard for the railroads' position as an indispensable factor in our commercial and economic world, and the safe and expeditious movement of both rail and vehicular traffic. It should be recognized that every grade crossing is an actual or potential hazard and source of economic losses in the form of accidents, danger to life, delays and traffic congestion.

Need of Highway Plan and Proper Control

The proper basis for dealing with grade crossings and grade separations, either actual or proposed, is a comprehensive plan of the existing and proposed major and secondary highways, covering a large area, and the rail lines. It is impossible to deal fairly and intelligently with a single application for a grade crossing or grade separation without knowing what the city, county or state authorities plan as the ultimate development of through highways for the locality.

An analysis of the situation in Los Angeles County, Calif., indicates that without strict cooperative grade-crossing control there will be six times as many crossings as are necessary for the area. If this should happen, each major railway line, whether steam or electric, would become, in effect, nothing but a local street-car line, and would be rendered practically useless as a medium of transportation for either passengers or freight. The table which follows indicates that if grade crossings are confined to the principal thoroughfares, then when all projects included in the ultimate highway plan for the Long Beach-Redondo Area, as proposed by the Regional Planning Commission, are carried to completion, there will be needed only 264 crossings, less than 52 per cent of the number now in existence.

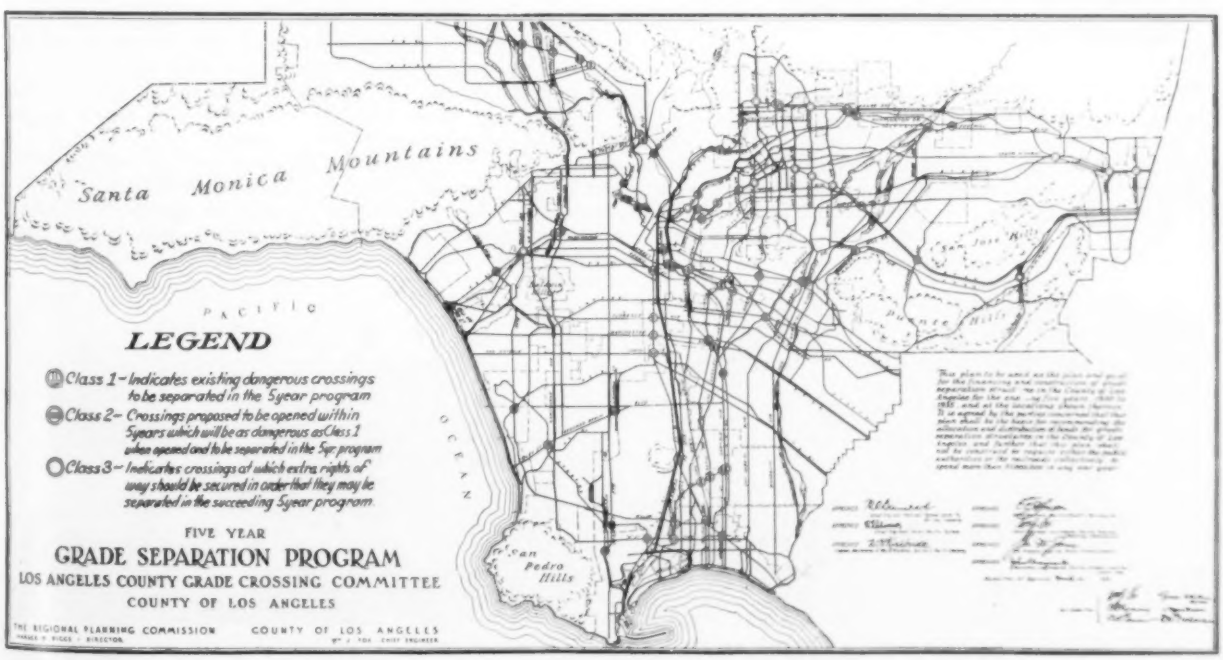
GRADE CROSSINGS AND GRADE SEPARATIONS
(Long Beach-Redondo Area)

	Existing Crossings		Major and Secondary Highway Crossings					
			Existing Highways			Proposed Highways		
Railroad	At Grade	Separated	Major	Secondary	Total	Major	Secondary	Total
Pacific Electric...	292*	8	59	34	93	34	18	52
Southern Pacific..	22	1	16	..	16	8	3	11
Santa Fe.....	51	4	20	6	26	10	8	18
Union Pacific.....	57	3	20	8	28	11	9	20
Total	422	16	115	48	163	63	38	101

* Does not include private crossings.

Five-Year Grade Separation Program

In the studies made in the preparation of the five-year program, the relative importance of the various rail lines, as affecting the necessity of grade separations, was carefully weighed. There are many branch lines of the combined railway system in this county which do not, and


Santa Monica Mountains
PACIFIC
OCEAN
San Pedro Hills
LEGEND
Class 1 – Indicates existing dangerous crossings to be separated in the 5 year program
Class 2 – Crossings proposed to be opened within 5 years which will be as dangerous as Class 1 when opened and to be separated in the 5yr program
Class 3 – Indicates crossings at which extra rights of way should be secured in order that they may be separated in the succeeding 5 year program
FIVE YEAR
GRADE SEPARATION PROGRAM
LOS ANGELES COUNTY GRADE CROSSING COMMITTEE
COUNTY OF LOS ANGELES
THE REGIONAL PLANNING COMMISSION
COUNTY OF LOS ANGELES

never will, warrant the expense of grade separation, as there is no great hazard at these crossings, nor any appreciable economic loss by reason of traffic delays. A map was prepared showing the lines along which the consideration of grade separation is warranted, this map being extremely helpful to the Grade Crossing Committee in dealing with future applications for grade crossings, or grade-separation structures, and in determining the relative importance of intersecting highway and railway lines.

Principles of Procedure

1. A comprehensive plan of actual and proposed major and secondary highways was prepared by the proper authorities and officially adopted.

2. Using this comprehensive plan as a basis, a program of grade crossings was prepared, providing for the establishment of new crossings only where absolutely necessary and for the abandonment of unessential, unimportant and dangerous crossings.

3. A systematic program of grade-separation projects at designated locations was prepared and a financial program set up for carrying it out.

4. A definite amount of money is set aside each year for carrying out this grade-separation program ($1,000,000 annually).

5. Grade crossings in the vicinity of grade separations are closed and traffic directed through the underpass or overpass structure.

6. New crossings are granted or permitted at grade until public necessity and conformity with the comprehensive plan have been established.

7. Regular conferences are held with public officials in order that they may become familiar with these problems and with the plan, use their influence to secure the closing of unnecessary crossings under their jurisdiction, and be encouraged to foster a program for the separation of grades where economically feasible.

Program Receives Official Approval

The entire program as finally worked out by the subcommittee calls for 70 crossings to be separated in the five-year period, or about 15 each year.

The five-year program has been checked by all interested parties. In order to assist in the preparation of the annual budget for capital expenditure, the plan and program were submitted to the officials of the railway lines and of the public bodies for approval and endorsement. The representatives of both the railways and the public bodies have endorsed and approved the plan and program as here set forth. Grade separations are being considered and constructed in accordance with this plan and program.

Street Cleaning Organization and Costs

By **JOHN JENTZEN**
Chief, Sanitary Department, Atlanta, Ga.

IN order to secure the most economical distribution of equipment in street cleaning, it is necessary to plan definitely the route to be covered each day or night by the street cleaning equipment. A superintendent of the Sanitary Department of Atlanta, Ga., is in complete charge of the routing of the equipment. He also checks on the work of the drivers' seeing that they perform their duties completely and satisfactorily.

To clean the streets of Atlanta, which has a reputation for the cleanliness of its thoroughfares, ten pick-up sweepers and three motor flushers are used. The pick-up sweepers operate eight hours, starting from the garage at ten in the evening and returning to the garage at six in the morning. These sweepers are routed out every night in different sections of the city.

The business section is swept every night and the residential sections of the city are thoroughly cleaned at least twice a week.

Costs

In 1931, the ten pick-up sweepers traveled a total of 69,705 miles in cleaning the paved streets of Atlanta. Sweeping is done only during dry weather, for it is impossible to sweep the streets satisfactorily when it is either raining or snowing. Thus during the winter and spring considerable time is lost from the sweeping schedule. The drivers are paid one-half their salary when they report for work and cannot go out on the streets because of rainy weather.

The total cost of cleaning the streets in 1931 was $59,281.50. This includes the pay of the superintendent, the broom drivers, the cost of gasoline, oil, depreciation and repairs on brooms. The total cost when distributed amounts to 85 cents per mile.

FLEET OF STREET SWEEPERS IN ATLANTA, GA.

Water Treatment Today— and What of the Future?

Part I

By ESKEL NORDELL

IN considering the treatment of water for municipal purposes, it is essential to keep in mind that we are living in an age of rapidly changing and rapidly advancing standards.

It may have been true, as Mark Twain has said, that the former inhabitants along the Missouri liked their river water straight and that if any mud had settled out in their drinking glass they stirred it back into suspension before they drank it so that they might miss none of its hearty, rich, nutritious qualities. But it is not true now, for the public insists on having its water supply free from mud, free from color, and free from harmful bacteria. Undoubtedly, it is the first duty of every municipality to see that its water supply is at all times safe and satisfactory for drinking purposes.

However, the fact that a water supply is ideal for drinking purposes does not prove that the water is also ideal for either industrial or domestic purposes, for there may be mineral impurities present which are of little or no consequence as far as drinking qualities are concerned but which are of great and far-reaching consequences as far as industrial and domestic use are concerned. The public has always been aware of these undesirable mineral impurities in its water supplies and is now rapidly learning that these undesirable impurities may be either eliminated or at least greatly reduced by proper treatment. It will therefore be only a comparatively short time before every municipality will be required to furnish a water supply which is not only bacteriologically safe, but also suitable for all domestic and industrial purposes.

"Pure" Water

Pure water does not exist in nature, and the kinds and amounts of impurities present in a natural water supply vary according to the conditions attendant on its formation and collection. All natural fresh water supplies are derived from moisture precipitated from the atmosphere as rain, hail, snow or sleet. These substances are popularly believed to be pure, but this, like many other popular beliefs, is erroneous. For these substances, in falling through the atmosphere, come in contact with dust, dirt, soot and gases. While some of this matter is insoluble and is merely carried along as suspended matter, a certain portion is soluble and therefore rainwater or the water formed from melting snow, hail or sleet is not really pure water.

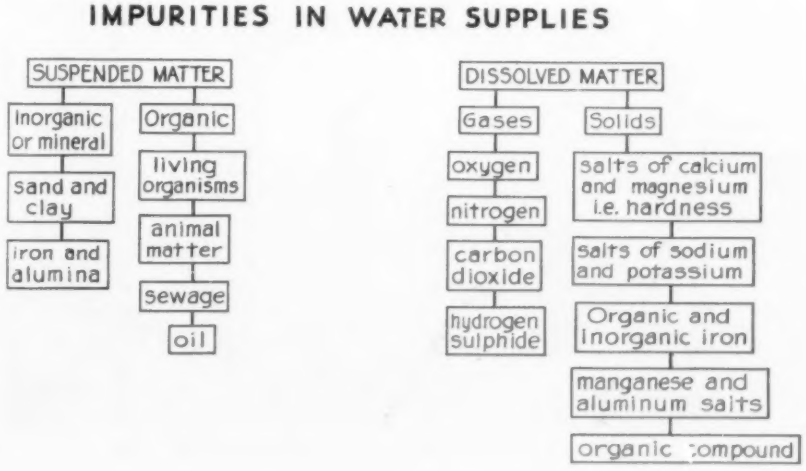
As this water comes in contact with the earth's surface, it picks up more impurities, some of which are soluble and some of which are insoluble but finely enough divided to be carried along in the surface waters as suspended matter. In the case of ground waters, such as are obtained from wells and springs, the filtering action exerted while they were percolating through the ground has usually removed the suspended matter, but, owing to the longer and more intimate contact with various rocky materials, such waters are likely to contain more mineral matter than the surface waters.

Suspended Matter

The amounts of suspended matter present in any given water supply may vary greatly from time to time, depending upon local conditions. Immediately after a rainfall, the suspended matter may be very high in amount. Many streams are so turbid during part of the spring months that they might be called muddy, while during the summer they may run fairly clear. The suspended matter in a river will vary, not only from season to season, but even from day to day. In the case of surface supplies drawn from lakes and ponds, the variations in turbidity are not likely to be so great as with rivers, for a considerable settling action occurs in large bodies of quiescent water. But even with such bodies of water, there are seasonal changes which may suddenly alter the turbidity very greatly.

This is especially the case with the changes known as the fall turnover and the spring turnover. At such times, temperature changes in the water cause the layers to shift so that the suspended matter lying at the bottom is stirred up and the whole body of water may become very roily and muddy. In large lakes, wave action, caused by storms, may make the water turbid for days.

(To be continued in the June issue)



Present-Day Swimming Pools Achieve High Standards of Design and Operation—II

THE characteristic excellence of present swimming pool design, construction and operation were strikingly illustrated in the March issue of THE AMERICAN CITY (pages 74-76). To the four descriptions there given are now added accounts of four widely separated swimming pools in this country, of individual distinction.

Some of the results of a nation-wide inquiry on swimming pools are also presented, affecting the plans of Bellwood, Ill., in the expenditure of $150,000 for this form of healthful recreation.

In Grand Rapids

One pool, with all the characteristics outlined at the outset of this article, is just being completed at Richmond Park, Grand Rapids, Mich., where it was undertaken as a measure of unemployment relief. It is of reinforced concrete, 150 by 150 feet, and will have, as the illustration shows, a large and substantial bathhouse of brick with tile roofing. Of the total $70,500 spent for the complete development, $24,000 was for the bathhouse and equipment, $12,000 for the pool, $21,500 for the recirculation and filtration plant, and $13,000 for the filter house. Approximately $27,000 was spent for labor; about $9,000 in scrip and the balance in cash to skilled workers.

The recirculation and filtration system, supplied by the Graver Tank and Manufacturing Corporation, gives a complete change of water every eight hours. The bathhouse has 122 dressing stalls, 61 for girls and women, and 61 for men and boys. The structure was built and will be operated under direction of U. M. Lowing, Park Superintendent.

THE POOL AND BATHHOUSE AT RICHMOND PARK, GRAND RAPIDS, MICH.

In Los Angeles

A smaller pool, but one of great distinction as to landscape and architectural design, is that which was completed and put into use during the 1931 season on El Sereno playground, Los Angeles. This, also, was an unemployment relief project and was completed at a cost of $40,000 as one item of the million-dollar Playground and Recreation Department unemployment relief bond issue. Six new pools and five bathhouses are among the provisions that were made for the enjoyment of this plant. The El Sereno bathhouse, like most of the Department's recreation buildings, is of California Spanish design, as shown in the photograph reproduced at the left. The pool is 50 by 150 feet. Thirty per cent of the area is graduated in depth over 4½ feet; the remainder is from 2½ to 4½ feet. The pressure filter system in use turns over the whole body of water more than three times every 24 hours. There is a wet pulsating type of chlorinator. The water is tested periodically by the City Health Department, under supervision of the State Health Department. The white-cap non-swimmer safety scheme, used elsewhere at pools under the Playground and Recreation Department direction, is used here also, and there is adequate lifeguard service. The peak attendance at one time was 425; the daily attendance over 1,000. In addition to the swimming pool, the El Sereno unit includes a bathhouse structure which is also a community clubhouse building. Facilities include a large recreation hall, meeting rooms, kitchens, offices, etc. The bathhouse equipment on the lower floor, the lockers, shelves, bathing-suit and towel storage facilities, checking facilities, etc., are portable, so that they may be re-

EL SERENO COMMUNITY BUILDING AND PLUNGE, LOS ANGELES

moved after the swimming season and provide room for general recreational purposes.

A Valuable Discovery at Valley Stream, L. I.

In Valley Stream State Park, Nassau County, Long Island, just east of the New York City line, is a 17-acre lake, about 3.6 acres of which is used for bathing. On account of its location in the metropolitan area, this park, operated by the Long Island State Park Commission, caters to large daily crowds of bathers, the largest number on a single day having been 12,285. The average holiday attendance is 6,700, the average week-day attendance 1,800.

The problem of chlorination here was an extreme one, because the water is not confined by four impervious walls as in a regular pool, but is impounded behind an earth dam and held within a natural basin, and also because only a part of the water is used for bathing purposes and only that general area chlorinated. The lake has a soil bottom precluding use of any of the established systems of application. Muck and

THE BATHING AREA IN VALLEY STREAM STATE PARK

algae growth, not yet fully under control in other parts of the lake, drifted into the bathing section, bringing an added factor of contamination to be overcome by chlorine. The problem was solved through a series of experiments extending over a considerable period.

An expanse of about 4½ acres received chlorination treatment. The effect of sunlight on this wide expanse was found to cause a regular depletion of the chlorine residual during the day. Values drop from .6 to .8 p.p.m. at 8 A. M. to around .2 to .1 about 3 P. M. The values climb again at this point, and by 8 P. M. the residual chlorine is about .3 to .4 p.p.m. A treatment for keeping the chlorine residual values up during the day has met with great success. Instead of installing an ammoniator, with attendant delays, ammonium sulphate was added at the intake of the lake. The results proved very gratifying; whereas the residual values formerly dropped to as low as .1 p.p.m. they are now kept up around .4 to .5 p.p.m.

The system, which is giving highly satisfactory results, includes these units: a pump house and operating room with two Wallace & Tiernan vacuum type chlorinators, a 1,500 g.p.d. De Laval centrifugal pump operated by a 15-hp. General Electric motor, a limestone tower, and a battery of three injector units. The water from the lake is picked up through an 8-inch main protected by a crib. The chlorine solution is passed through the limestone tower and injected into the 8-inch main on the discharge side of the pump. The 8-inch main runs along the west side of the lake, and there are five 6-inch laterals extending across the lake from this main. These laterals are placed every 100 feet along the main and are drilled with quarter-inch holes about every 10 feet. Through these holes the chlorine is fed.

In this manner, 1,500,000 gallons per 24 hours is treated. The plant is operated on a 24-hour schedule. During the past season the chlorine treatment was increased from 200 to 300 pounds per 24 hours, and the system was revised so that it is possible to feed a maximum of 410 pounds per 24 hours. The results have been exceedingly gratifying. Tests for residual chlorine are made every two hours, and water samples are collected once a day for bacteriological tests. Tests for residual chlorine indicate that the chlorine is working upstream at least 5 feet. The residual chlorine is seldom less than .2 p.p.m. Of the over 300 tests for bacteria made during the peak of the bathing season in 1931, less than 9 per cent showed evidence of B. coli.

Tests and experiments have convinced the Long Island State Park officials that the system of chlorination described is adequate to insure safe bathing conditions in almost any freshwater lake, without the expense of concrete sides and bottom for the bathing area. This means that any community can put to recreational uses its small lakes and ponds and furnish a safe and economical bathing beach for its inhabitants.

In Albuquerque

Turning a mosquito-infested swamp and city dumping ground within three months' time into a swimming pool and bathing beach to accommodate more than 7,000 persons, is the record made by city officials of Albuquerque, N. Mex., through cooperation with the Middle Rio Grande Conservancy District.

City officials had for years thought about constructing some kind of pool, but to build one capable of properly serving the city was out of the question.

The Conservancy District is a flood control, drainage and irrigation authority. Its levees extend on both sides of the river for a distance of 50 miles north and 90 miles south. Dangerous bends in the river are straightened; levees and cofferdams are constructed to keep the muddy water of the Rio Grande in the river channel. In doing this work, a riverside levee had to be constructed through the city dumping ground along a dangerous bend in the river. When the Conservancy District first started its flood control program, a series of Kellner Jetties were installed upstream from this dangerous bend. The water was diverted to the middle of the river dur-

THE 17-ACRE LAKE IN VALLEY STREAM STATE PARK, NASSAU COUNTY, LONG ISLAND, N. Y.

SWIMMING POOL AND BATHING BEACH, ALBUQUERQUE, N. MEX.—ONCE A SWAMP AND DUMPING GROUND

ing normal stages, but probably would have overflowed this reclaimed land and perhaps damaged the main riverside levee during flood stage.

When plans for the construction of the main levee were completed, it was decided to construct a cofferdam or auxiliary levee about 400 feet farther out in the river as an added protection. This left a natural basin. J. L. Burkholder, Chief Engineer of the District, immediately saw the opportunity of developing a swimming pool. He called it to the attention of Mayor Clyde Tingley, who was quick to take advantage of this natural situation. Mayor Tingley's hobby is parks and playgrounds. Here was a chance to obtain a swimming pool and beach big enough for a city several times as large as Albuquerque. The Conservancy District agreed to place extra earth in the levee, do some excavating at various points where needed, and build the necessary structures on a cost basis.

The pool covers more than 20 acres. It is 4,000 feet long, with a maximum width of 400 feet and a maximum depth of 15 feet. Extending around the pool for the entire distance of 4,000 feet on both sides is a 30-foot beach of clean Rio Grande sand of as fine quality as could be desired.

Water for the pool, from one of the up-country drainage ditches, is clear and cold. It flows into the pool through a 30-inch inlet pipe at the rate of 14 cubic feet per second. A chlorinator was constructed over the inlet pipe so that the water could be kept free of germs. A 24-inch outlet pipe at the downstream end of the pool passes the water back into the river.

Gates have been installed on both the inlet and the outlet structures, so that the water can be diverted into the river before reaching the pool or raise the water level in the pool at any time.

Bathhouses, with provisions for several hundred persons, were built near the main entrance of the pool. Two small islands in the pool lend beauty to the landscape. This new recreational center is proving exceedingly popular with the citizens, and with visitors from other towns.

A Significant Inquiry on Swimming Pools

Recent action of officials of the Bellwood Memorial Park District, Bellwood, Ill., is worth citing as an example of the attention being given to municipal swimming pool design and construction. This authority, which is about to spend $150,000 on swimming pools, conducted a national survey to find out:

(a) What park and recreation officials and other authorities thought the best type of pool;

(b) What, in the experience of these authorities, should be done, or avoided, in pool development;

(c) What individual or firm, if any, is especially qualified to handle the whole design and construction work.

To 134 letters sent to 101 cities in 46 states, 92 replies were received. The reply to (a) was noteworthy for the differences of opinion as to the best type of pool; but one point stressed in numerous replies is that the architect or engineer can best determine this, with all facts at his disposal. One interesting point stressed under (b) was that most pools are larger than necessary; another was that 60 to 90 per cent of the pool area should be of wadeable depth, and that there is a definite "no man's land" in many pools of graduated depth, since water of two feet and thereabout in depth is too deep for children and too shallow for grown-ups; a third was that curbs and projecting pool edges are to be avoided; and, among others, there was the suggestion for eight-hour recirculation.

Nearly 70 firms and individuals were recommended as engineer-designers, and particular stress was laid on the importance of competent services in this particular.

After studying the theoretical and practical qualifications, the general professional ability, and experience in this field, the authorities employed Wesley Bintz, of Lansing, Mich. According to Chris Lange, President of the Bellwood Memorial Park District, Mr. Bintz was recommended in the replies from park and recreation officials and other authorities more times than a total of the next six men or firms mentioned.

A Housing and Town-Planning Study Tour to Southwest Germany and Switzerland

A TWO-WEEKS housing and town-planning study tour to southwest Germany and Switzerland this summer is being organized by the International Housing Association. Starting in Frankfurt-am-Main, the party will go via Mannheim, Heidelberg and Karlsruhe to Basle. From there the journey will be made in motor coaches, visiting Berne, Biel, Freiburg, Murten, Lausanne, Geneva, Montreux, Col de Pillon, Spiez, Interlaken, Brunig, Lucerne, Zurich and Winterthur. The cost of the trip will be 535 Swiss francs for members of the Association, and 560 for non-members, all expenses being included. Details may be obtained from Dr. H. Kampffmeyer, General Secretary, International Housing Association, Hansa Allee 27, Frankfurt/M., Germany.

The True Statements

IN the January issue of THE AMERICAN CITY, at pages 112 and 113, appeared 80 "true or false" statements on municipal administration. According to Dr. Lent D. Upson, Director of the Detroit Bureau of Governmental Research and author of the textbook "Municipal Administration," which was used as the basis, the following statements were true, the others false: 9, 124, 135, 145, 152, 183, 263, 269, 296, 303, 317, 356, 397, 411, 420, 438, 450, 453, 460, 462, 474, 480, 482, 487, 495, 502, 508, 520, 525, 532, 553, 573, 578, 609, and 631.

How Can Police Costs Be Safely Reduced?

Possible Ways of Lessening the Expense of Local Police Protection without Impairing the Effectiveness of the Service, as Set Forth in a Report for the State of New Jersey

IN the course of a general investigation into local finances in New Jersey by the Commission on County and Municipal Taxation and Expenditures* the cost and effectiveness of local police protection was studied, and a report thereon has recently been issued. In reviewing the situation it is stated:

The people have demanded constant improvements in the range and quality of police service, but they have given little or no thought to the best and most economical ways of providing that service. Governing bodies have not exercised a close control over expenditures, and in a number of the largest communities the cost of police service is excessive, due largely to the absence of standards of service and costs and of intelligent criticism based on such standards. . . .

The factors of high cost and low efficiency are analyzed. The first in importance in New Jersey is the multiplicity of relatively small police departments, each trying separately and independently to perform a task which has no relation to the municipal boundaries. Criminals and traffic violators are conspicuously mobile, but the function and authority of the local police official stops at the municipal boundary. There are 348 separate and independent police departments in New Jersey, of which 127 are in the five counties covering but about 700 square miles in northeastern New Jersey. Nowhere else in the United States is there such a concentration of multiple police agencies in so small an area. This is undoubtedly a major cause of the higher costs in the state and particularly for the police departments in that region.

Other factors of high cost and low efficiency that are considered are the general lack of standards; lack of adequate records and reports on which standards and comparisons could be based; failure to make use, to the extent practicable, of modern devices for rapid communication, transportation, and traffic control with a view to increasing the effectiveness of the individual policeman, while at the same time reducing the number of men.

The credit due to individual policemen and officials for their commendable virtues of physical valor and devotion to duty is stressed, but it is brought out that the requirements for modern police duty are much higher than is provided for by the traditional conception of the police officer, and call for higher standards for entrance, as well as for systems of effective training which should be coordinated and extended to all present officers and men and to all new recruits.

On the other hand, attention is directed to the increased cost and lowered efficiency resulting from political influence and unthinking popular demand for heavier manning and special services. The need for greater attention to the crime preventive aspects of police work is also indicated, particularly with reference to preventive work with juveniles who are on their way toward lives of crime. . . .

*This commission consists of J. H. Thayer Martin, Chairman; J. F. S. Fitzpatrick, Secretary; George D. Cross, M. M. Stallman and Joseph L. Thomas. The studies involved were made under the supervision of Harley L. Lutz, Professor of Public Finance, Princeton University, as Director, with a staff consisting of members and consultants of Griffenhagen and Associates; Frank O. Everett, Chief of Staff. The document here referred to, Report No. 7, Local Police Protection Services and Costs, was signed by four of the members, Mr. Fitzpatrick dissenting in a minority statement. Report No. 4, Local Fire Protection Services and Costs, was the subject of an article in THE AMERICAN CITY for January, at page 76. With regard to Report No. 7 see also department of Municipal and Civic Publications in this issue.

The recommendations of this report may be briefly summarized as follows:

A. State Participation in Police Protection

1. Costs of police protection in relation to standards for adequate service should be under examination and criticism by a division of standards and costs in the department of municipal accounts. Standardization of salaries should be provided for.

2. The state should render assistance and cooperation in the development of adequate provisions for police training. All present officers and men and new recruits should be required to qualify through the established courses, for which the existing facilities in city police schools should be utilized as a basis.

3. The reporting of police statistics according to a uniform classification should be made compulsory. The initiation and supervision of such work should be made the duty of the present state bureau of identification, which should be renamed the bureau of criminal identification and statistics.

(a) The state should officially adopt the uniform classification of offenses prepared by the International Association of Chiefs of Police as the standard basis of crime reporting.

(b) Methods of police reporting should be worked out in conjunction with a commission composed of state and local representatives.

4. State police should be empowered and required to take part in investigations and other action, and to cooperate with the local police, where the presumption is that the offender may be located in a municipality other than that in which the offense was committed.

B. Local Reorganization

1. An ultimate objective in local police organization obviously demands a larger administrative area than the present small municipality. It is recognized, however, that the reorganization of the police service in the direction of larger units cannot proceed except as the growth of larger administrative areas for other purposes comes. If and when the numerous urgent problems involved in an adequate organization of the metropolitan areas are taken up and seriously dealt with, it will be proper to consider the creation of metropolitan police districts which will assume some, if not all, of the police duties for such districts.

2. Until consolidation of metropolitan district organization can be brought about, systematic cooperation among police departments should be promoted as an alternative means of realizing some of the results that could thereby be secured. This cooperation should be assured by creation of country-wide committees of police chiefs with an executive committee in each county, composed of the chiefs of the larger departments, to provide for cooperation to minimize the effects of municipal boundary lines as obstacles to the mobility of police forces. There should be an executive committee of each such organization, and provision for systematic intercounty aid and cooperation should be established.

3. The policy of creating special units such as the county park and boulevard police and police forces of interstate bridges and tunnels should be discontinued and as rapidly as possible the present special units should be consolidated with the municipal or state forces, except as the entire police function may eventually be merged with the county or re-

gional unit of police administration. The county as a unit should be deprived of the right to raise taxes for the support of special police until such time as the county may become the unit for the administration of the police function.

4. Future legislation should avoid detailed provisions respecting local procedure or local organization. It should include only general principles of sound organization and procedure.

C. Local Methods

1. Foot patrol should be replaced by motor patrol except as it is used as a supplement to motor patrol on night tours of duty in the business district.

2. Expenditures for signal equipment, radio equipment, and automobiles, for patrolmen and supervisors as needed for carrying out planned and systematic measures of improvement and economy, should take precedence over every other type of expenditure except that for the better training of men.

3. Day and night forces should be reapportioned to give the maximum effective strength during the night hours when conditions are most hazardous.

4. All police assignments should be based upon actual needs for service as revealed by an analysis of adequate records.

5. A central record bureau should be maintained by every large police department for the purpose of collecting and compiling, according to a uniform classification, a complete record of all offenses known to the police, all persons charged by the police, all offenses cleared, all convictions obtained and other information conducive to better methods of planning and control.

6. The use of regular policemen on special details should be reduced to a minimum and all routine clerical work should be done by civilians.

7. Authority should be given all policemen to make arrests in any part of the state.

8. The civil-service standards for entrance into the police service of the different ranks should be raised, and minimum standards should be imposed for police positions not under civil service control, to be enforced through the requirements for qualification through the police training courses.

9. Periodic re-examinations or an effective service rating system should be established and actively enforced, for the elimination of incompetents.

10. Police vacations should be distributed throughout the year with a minimum of absences during the summer months.

11. Reserve duty should be abolished except as it is organized as a unit under the immediate direction of the chief or his assistant.

12. Any citizen of the state should be made eligible for appointment on any police force without the fulfillment of further residence requirements in a given municipality, in order that the taxpayers may not continue to be deprived of the best service that can be obtained when local applicants are not of high order of competence.

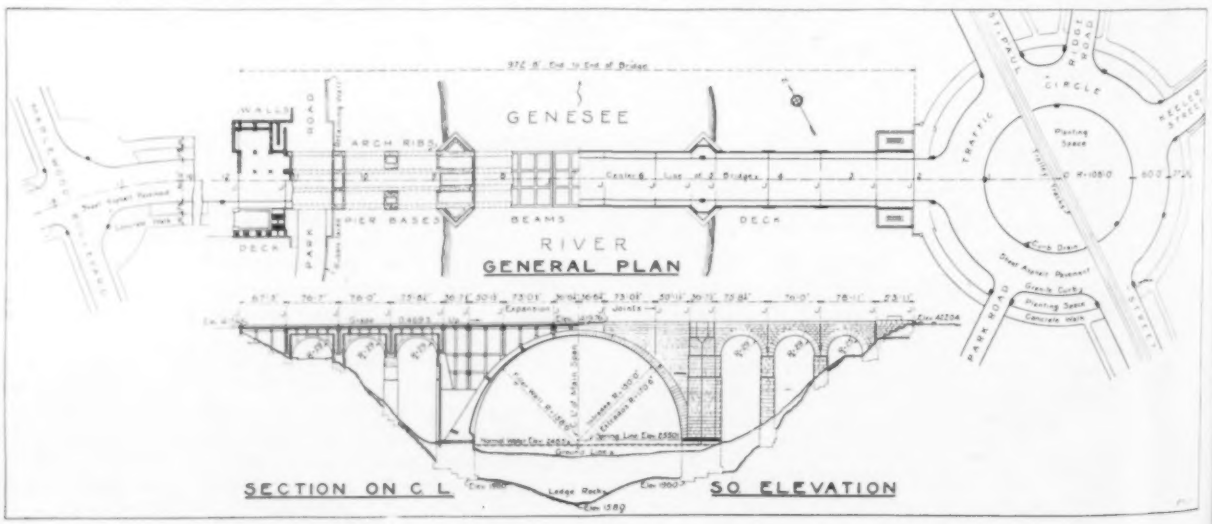
The Model and the Bridge

How a Major Municipal Improvement in Rochester, N. Y., Was Visualized and Completed

VETERANS' Memorial Bridge, recently opened for traffic in Rochester, N. Y., is an excellent example of how a needed public improvement can be visualized and helped toward approval and construction by the art of the model-maker.

The Genesee River, flowing north, divides the city, and renders communication very difficult between the two portions; especially is this true in the location of Ridge Road, because there the river flows in a gorge nearly 200 feet deep. On either rim of this barrier, a public park extends along the river for a considerable distance, and beyond these park areas are important residential districts.

As early as 1906 a preliminary plan was prepared for a bridge at this site, but it was not until 1929 that plans prepared under contract with Frank P. McKibben, consulting engineer, of Black Gap, Pa., were adopted, Gehron and Ross, architects, of New York, were associated with Mr. McKibben. While the final drawings were being prepared, a model of the bridge was built by Walter Favreau, of New York. This model, three photographs of which are here shown, was placed on exhibition in the City Hall Council Chamber while the bridge was under

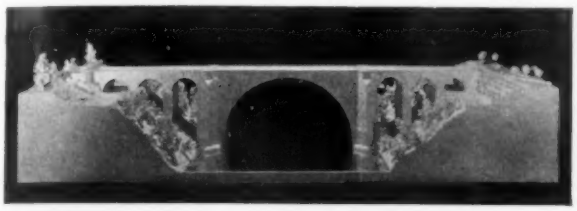


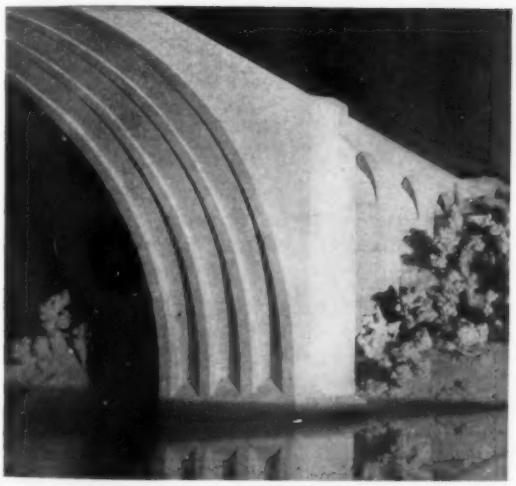
discussion. After the appropriation ordinance was passed by the Council, the model was exhibited in the window of the Rochester Gas and Electric Corporation for several weeks, also in the lobby of the Chamber of Commerce, and later in a local store window near the site of the bridge. In all of these places it created a great deal of favorable interest and comment and was, in the opinion of Harold W. Baker, Commissioner of Public Works of Rochester, worth many times its value not only from the engineering and architectural point of view in obtaining the proper design, but also in acquainting the public with the magnitude, beauty and desirability of the project.

The west approach is simple, leading in a direct route from the Eastman Kodak Company's works through a residential section, then across Maplewood Park to the west end of the bridge. But the east approach is not so simple, because there the east- and west-bound traffic of Ridge Road crosses Saint Paul Street, which carries heavy traffic in a north-and-south direction. In addition to this, Keeler Street and a park drive converge into this intersection, thus making six thoroughfares entering one point. Several studies were made in which Saint Paul Street was depressed to permit traffic to and from the bridge to pass over without interference; but because of the limited distance between Saint Paul Street and the east end of the bridge, a satisfactory clover-leaf design for connecting the two levels was not obtainable. Consequently, a traffic circle with an internal diameter of 216 feet was chosen as the best solution. The electric-railway tracks were carried through the center of the circle. The roadway around the latter, in common with that on the bridge proper, has a width of 60 feet.

The spaces between the curbs and sidewalks, as well as the center of the traffic circle, will be landscaped appropriately, in keeping with the surroundings, while at the same time avoiding interfering with traffic.

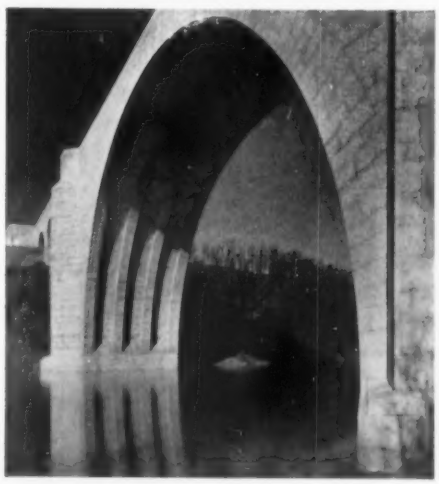
Maplewood Park along the west rim of the gorge is subject to extensive use. A driveway therein, close to the rim, was relocated and slightly depressed, and now passes under the west arch of the bridge.





VETERANS' MEMORIAL BRIDGE, ROCHESTER, N. Y.

Three views of the model are shown at the left, and corresponding photographs of the completed bridge at the right



State Highway

FIVE YEARS . . . NO MAINTENANCE

California State Highway—Route 101, near San Ardo. Two-inch Bitumuls Penetration on four-inch waterbound base. Built in April, 1927. Road is in excellent condition, with non-skid, waterproof surface. No maintenance has been necessary to date, after five years of heavy, primary-artery traffic.

City Street

THREE YEARS . . . NO MAINTENANCE

Berkeley, California—LeConte Avenue. Old worn pavement, on grades as high as 18%, resurfaced with Bitumuls Penetration, in 1929. Pavement on this heavily travelled, downtown residential street, is in excellent condition, after three years of service. There has been no maintenance necessary to date.

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Street Maintenance Economy Program in Queens County, N. Y.

Calcium Chloride Extensively Used to Conserve Street Surface in This Outlying Portion of New York City

By ARTHUR LOWE
Maintenance Engineer, Bureau of Highways, Borough of Queens, New York City

THE problem of maintaining new streets in rapidly growing metropolitan sections as well as carrying along a regular program of maintenance on the older streets had been one of our problems receiving very careful study by the engineering and maintenance divisions of the highway department. The types of streets to be built in these new sections are first considered from the taxpayer's viewpoint, which does not warrant the expense of a high type road; nor will our budget warrant paving these streets for a number of years.

Included in our highway system are 1,300 miles of streets comprising dirt, gravel, cinder and macadam. In common with many other cities, we have standardized on the use of calcium chloride as the most economical method of dust laying suitable for these streets. This decision was reached only after complete investigations and experiments had been conducted by the engineers of the highway department in collaboration with our chief chemist and the representatives of the Solvay Sales Corporation. For the last three years we have carefully checked the costs of maintaining these streets with calcium chloride as a dust layer and have clearly demonstrated that the use of this material has made possible the maintenance of an increased mileage without increasing the budget.

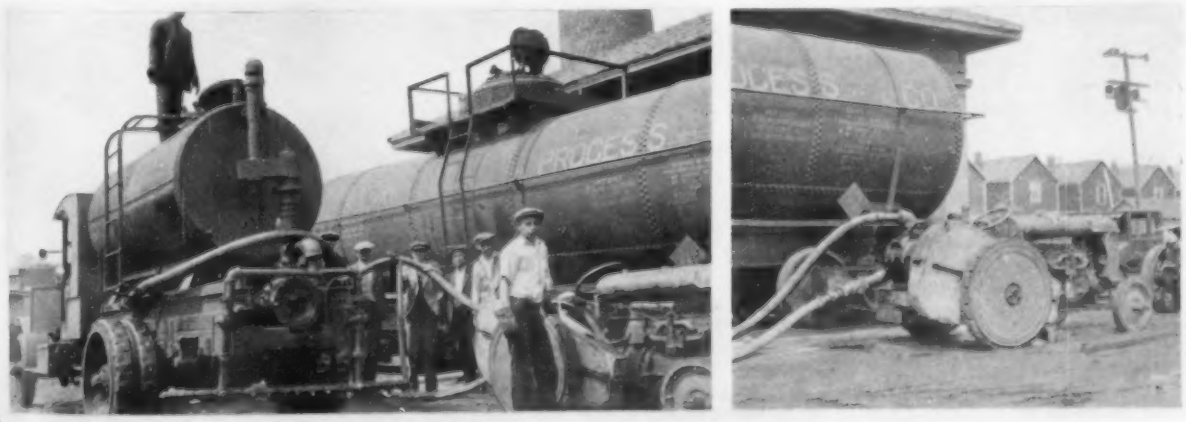
Liquid Calcium Chloride Used

In 1929 calcium chloride was included as a regular item in the road maintenance program, and in 1931 the department spread approximately 600,000 gallons of liquid calcium chloride at a cost of 2.25 cents per square yard laid down. Without proper equipment for unloading and spreading, liquid calcium chloride is neither as economical nor as satisfactory as the flake form. Fortunately, we had most of the equipment necessary to handle the liquor efficiently. Conditions in our county necessitate deliveries of calcium chloride in large quantities at various points from which it may be unloaded and spread within a short period of time over a large, densely populated area without involving long hauls through city streets. Liquid calcium chloride is received in 10,000-gallon tank cars. This must be unloaded into tank distributors for application on the streets. Our fleet of Hvass oil distributors were entirely satisfactory for this purpose. Regulated properly, these distributors are capable of spreading 10,000 gallons of liquor in half a day. While the applications vary according to the type of road treated, in general an average of 1/3- to ½-gallon of liquid calcium chloride per square yard is applied.

Unloading with Tractor-mounted Pump

The problem of unloading liquid calcium chloride and transferring it to the distributors was worked out by one of the engineers of this Bureau, and considerable time was given for the proper design of the pump devised to handle the unloading. From the picture showing the pump mounted on the Ford tractor, it will be seen that this outfit may be moved quickly and easily between widely separated points where delivery and handling of the material is desired.

The fact that this pump can load a distributor truck in five minutes together with the fact that it can be moved between widely separated points so quickly, demonstrates



LOADING LIQUID CALCIUM CHLORIDE FROM A TANK CAR TO THE DISTRIBUTOR
Left.—The distributor, and in the foreground the tractor and pump. Right.—Rear of the tractor, showing the pump mounting

facts

you'll want

to know about

THE NEW CHEVROLET SIX-CYLINDER TRUCKS

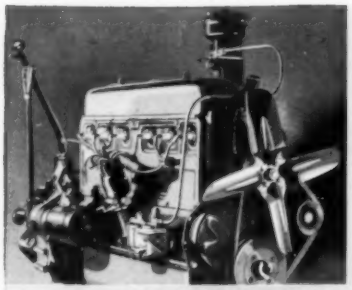
CHEVROLET six-cylinder trucks, already generally accepted as the most economical in America, now embody sweeping improvements in bodies and chassis, and are substantially lower in price. You can now buy them for as much as *$10 to $65 less than last year's prices*—even then among the lowest at which trucks are sold. You can choose from an even wider range of larger, stronger, and more handsome bodies, in three different wheelbase lengths—*a model for every hauling need.* You can count on even more power, more speed, greater handling ease, longer life and more comfortable driving quarters, for Chevrolet has strengthened, enlarged, and otherwise improved practically every part of these trucks. *And you can still rely on Chevrolets for lowest fuel and upkeep costs.* That, in general terms, is the story of Chevrolet's newest contribution to more efficient and economical hauling. Study the pictures and detailed descriptions at the right and you will learn *exactly* why the new Chevrolets are the most economical trucks in America—and the logical hauling equipment for your particular business.

CHASSIS PRICED AS LOW AS **$345**

½-TON MODELS WITH BODIES PRICED AS LOW AS **$430**

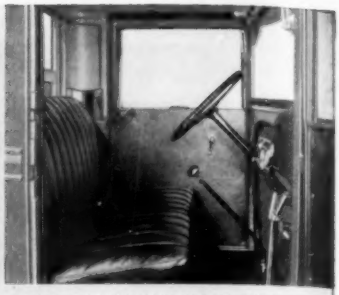
1½-TON MODELS WITH BODIES PRICED AS LOW AS **$670**

All prices f. o. b. Flint, Michigan. Special equipment extra. Low delivered prices and easy G. M. A. C. terms. Chevrolet Motor Company, Detroit, Michigan. Division of General Motors



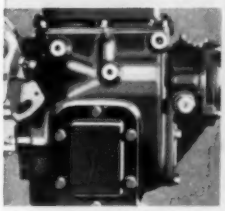
SIX-CYLINDER TRUCK-TYPE ENGINE

The new down-draft carburetor, improved lubricating and cooling systems, counter-balanced crankshaft, harmonic balancer and many other advancements add to the power, speed, smoothness, economy and dependability of Chevrolet's special valve-in-head truck engine.



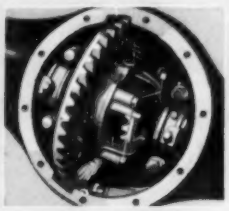
ROOMIER, MORE COMFORTABLE CAB

The new Chevrolet cab is larger. The all-metal roof is insulated, as is the floor. The wide, weather-stripped doors have plate glass windows. Equipment includes cowl ventilator, automatic windshield wiper and rear vision mirror. Driving comfort is assured in any weather.



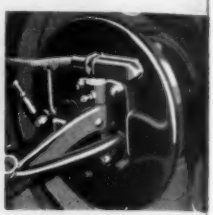
4-SPEED TRANSMISSION

Chevrolet's 4-speed transmission, with its reduced gear ratios, provides extra pulling power. Six-bolt power take-off opening. Half-ton models have Syncro-Mesh shift.



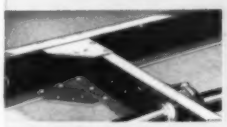
SPECIAL TRUCK-TYPE REAR AXLE

Chevrolet's heavy special truck-type semi-floating rear axle is larger and stronger in shaft, gears, bearings and housing. On the 1½-ton models the gear ratio is now 5.43 to 1.



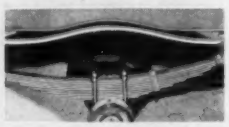
TRUCK-TYPE 4-WHEEL BRAKES

Chevrolet's large four-wheel brakes are equipped with special moulded linings to make them unusually powerful and effective. They are fully enclosed and weatherproof.



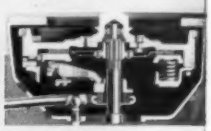
SPECIAL TRUCK FRAME

The Chevrolet channel steel truck frame now has an additional sturdy cross member, making six for the 157" model, and five for the 131" model.



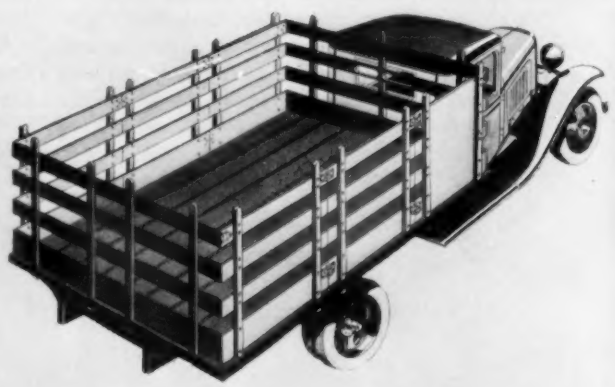
SEMI-ELLIPTIC SPRINGS

Chevrolet six-cylinder trucks have four long, heavy, semi-elliptic springs made of the finest spring steel obtainable, set parallel to the frame.



TRUCK-TYPE CLUTCH

The clutch on the 1½-ton models is simple in design—and fully capable of handling Chevrolet's increased power. Gentle, easy pressure operates it.



1½-TON 131" STAKE

Load space: 105½" long, 81¼" wide, 42" high. Heavy 1¼" floor supported on 6 steel cross-sills. Steel skid strips. Pressed steel stake pockets welded in beaded angle iron rub-rail. Steel-covered bumper on rear of platform. Many color combinations. Price **$725**

CHEVROLET SIX CYLINDER TRUCKS

its value and importance in the methods devised for economically using liquid calcium chloride as a dust binder on the type of roads treated.

Results Approved by Public

The public is so enthusiastic in praising our present method of maintaining these dirt, gravel, cinder and stone streets that it would be out of the question for us to attempt a change. This approval by the public has been due not only to the economies effected through the use of calcium chloride but also to the results obtained from the use of this material which absolutely does away with the dust nuisance, is odorless and clean, and has proved so valuable in our maintenance program.

A Shakespeare Garden for the Portland Public

By **FLORENCE GRAYDON RAGEN**

AS a means of arousing public interest in Shakespearean literature, the La Barre Shakespeare Club of Portland, Ore., has been instrumental in interesting the City Council in the establishment of a garden of Shakespearean flora as a civic project. The main construction of the project, which, although well under way, will cover a long period, is being undertaken by the Bureau of Parks of Portland under the direction of Mrs. Florence Holmes Gerke, landscape architect.

A similarity to Stratford-on-Avon is being emphasized in the development of the island set aside for the garden in Crystal Springs Lake. Located at the edge of one of the city's most beautiful residential districts almost in the center of an area of over 300,000 population, it will be preserved as a spot of natural beauty.

THE SITE OF THE GARDEN

The garden is being planted in the picturesque English manner with all the flowers and shrubs mentioned by Shakespeare with the exception of the weeds and tropical and citrous plants and trees. The temporary fill and rough road which now connects the island with the mainland is to be replaced by a stone bridge, which, with a footpath, will be the only means of approach to the Shakespeare Garden.

FORMAL PLANTINGS

Paths bordered with quaint old-fashioned herbs and flowers already wind over the broad lawns of the south end; and at the north end woodland flowers will be encouraged in true naturalistic effect. A broad lawn laid out especially for the staging of outdoor pageants or playlets by clubs, classes and study groups will have for its stage sets tall evergreen trees of every Shakespearean variety, and views of the crystal-clear lake mirroring sky, green slopes and shrubs. At the water's edge ducks and waterfowl native to the lake will continue to be protected.

While interest in the development centers in the La Barre Shakespeare Club, gifts of garden furniture such as stone seats, fountains, a sundial, flagstone, etc., are being planned by other Shakespearean and women's clubs in the city.

To help preserve the natural beauty of the garden, automobiles will be required to park in an area set aside for them outside the entrance. In a section adjoining but well apart from the body of the garden a picnic ground and boating concession will be maintained.

The Shakespearean garden movement is a comparatively recent one. Probably the oldest garden of this type in the United States is that in Toledo, Ohio, where the interested women worked twenty years toward the project. Small gardens are maintained in Central Park in New York City, at Golden Gate Park in San Francisco, and at Victoria, B. C. A collection of plants from England has been used in the small Shakespearean garden at Northwestern University at Evanston, Ill. A collection of Shakespearean flora has been placed around the library at Willamette University in Salem, Ore. Plans are being laid in Pasadena, Calif., for a similar development, it is reported.

The Portland garden, which is already attracting garden lovers as well as the intellectually minded, is designed to be, when finished, one of the most beautiful and extensive in the country.

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TRAFFIC CONTROL AND FACILITATION

Conducted by the Institute of Traffic Engineers, 175 Fifth Avenue, New York

Publications Committee: Maxwell Halsey, Chairman, Hawley S. Simpson, Harry H. Hemmings, Arthur G. Straetz, P. J. Stupka, Donald M. McNeil

A Proposed Solution of the Filling Station Problem

PAUL A. BANKSON, City Plan Engineer of New Rochelle, N. Y., and President of the Westchester County Planning Federation, believes he has an answer to the challenge of the gasoline filling station.

Filling stations have grown simply by the process of each station being followed, often immediately adjacent, by one or more of its competitors. As a unit of outlet for one of the greatest industries, the oil industry, it has received very little consideration by planners, zoners and city officials.

In 1931 the 26,000,000 automobiles in the United States were sold 12,000,000,000 or more gallons of gasoline through 124,000 filling stations. According to Mr. Bankson, each of these stations could double its output and with additional equipment add another 25 per cent; 75,000 stations could be abolished with an estimated saving of $235,000,000. As one out of two stations depreciates realty values, another $150,000,000 could be saved.

Mr. Bankson's study indicates that one station is needed for every 400 vehicles or every 2,000 persons. In Westchester County, the gasoline business is 3 per cent of the trade. In the four largest cities of that county—Yonkers, Mount Vernon, New Rochelle and White Plains—with a combined population of 286,000, there are some 292 locations, or one for every 246 private cars and every 1,000 population, or 6 1/3 per square mile. On 3¾ miles of the Boston Post Road from Bronx Park to Pelham Manor there are 41 stations, which if equidistantly located would be 500 feet apart.

Proposed Solution.—The center road filling station, a model of which is here reproduced, is suggested as a solution. Under this plan each community would devote the center of its roadway at strategic points to island parklets on which concessions for gasoline filling stations would be sold to the highest bidder. These would service 12 cars at one time.

The advantages claimed are: there would be no interference with vehicular flow; the property would be beautified, and there would be no lowering of property values; motorists could see it from a distance; maintenance would be less; construction would be simple and economical; it could be converted into a parklet; there would be no fire hazard to adjoining buildings; and it should be mutually profitable to the community and the oil company.

MODEL OF PROPOSED CENTER ROAD FILLING STATION

By Paul A. Bankson, City Plan Engineer; Leland Hubbel Lyon, architect; Harmon Randolph, model maker

Proceedings of the Second Annual Meeting of the Institute

THE Proceedings of the Second Annual Meeting of the Institute of Traffic Engineers has recently been published and distributed to members. Included are reports of Institute committees, and articles on important phases of the traffic problem contributed by members, together with a report of the joint session of the Institute and the Street and Highway Traffic Section of the National Safety Council. At this session representatives of eight prominent traffic signal manufacturers described the essential features of their traffic signal control devices.

Articles on the following subjects are included in the Proceedings:

Formulation of Curb Parking Regulations, by T. M. Matson.

The Use of Parking Facilities in the Central Business District of Baltimore, Md., by Dean J. Locke.

The Comparative Efficiency of Stop Signs and Stop-and-Go Signals at Light-Traffic Intersections, by Prof. R. L. Morrison.

Some Aspects of Traffic-Actuated Traffic Control, by Robert B. Dodds, Jr.

Some Economic Considerations Which May Be Applied to Traffic Problems, by H. H. Hemmings.

Accident Records at Work, by P. J. Stupka.

The International Aspect of Motor Traffic, by A. G. Straetz.

Street Traffic Control and Regulation in Europe, by Allen William Keller.

The Proceedings may be secured upon application to the Secretary-Treasurer, Institute of Traffic Engineers, 175 Fifth Avenue, New York. The price is $2.50 per copy.

Traffic Engineer for Columbus, Ohio

JAMES R. Guthrie, formerly Acting Assistant Engineer, City Planning Commission, Columbus, Ohio, has been appointed Traffic Engineer of the city of Columbus, taking effect March 28, 1932. In his former position Mr. Guthrie was assigned to the study of traffic problems, and his promotion to Traffic Engineer is a logical and merited one.

Mr. Guthrie is an Associate Member of the Institute.

Steadyflow Traffic Handbook in Preparation

FRITZ MALCHER, town and traffic planner, New York City, is engaged in the preparation of a handbook on the theory and application of the steadyflow system of traffic regulation, as described in various issues of THE AMERICAN CITY. Briefly, the purpose of this system of self-regulating traffic is to secure a steady flow of automobiles without intersection of traffic, on roadways built either with or without grade separations.

An important feature of the handbook will be a series of demonstrations of the possible application of steadyflow traffic to existing roadways and intersections in urban and rural areas, with maps in sufficient detail to make it possible for any competent traffic engineer or highway builder to apply the proposed solutions to his local problems.

Mr. Malcher extends a general invitation to engineers to furnish maps and traffic counts showing an existing inadequate street layout, complicated intersection, public parking space or other traffic condition needing correction. So far as possible these will be used in the handbook to demonstrate how the system proposed by Mr. Malcher may be applied to existing street layouts.

As Mr. Malcher has recently left on a trip to Europe, any material submitted for possible use in the handbook may be addressed to him in care of THE AMERICAN CITY.

TWENTY-THREE years of uninterrupted service may seem an exceptional performance history for any road. But to highway commissioners and engineers, who use Tarvia, such service

Front Street, New Bern, North Carolina. Tarvia-built, 1909.

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GOOD ROADS at LOW COST

Unemployed Complete Motor-Vehicle Accident Survey in Nassau County, Long Island

UNDER the sponsorship of the Nassau County Emergency Work Bureau a motor-vehicle accident survey has just been completed. The report of the survey contains a complete analysis of all traffic accidents for the year 1931 tabulated upon a form very similar to that used by the National Safety Council and illustrated with numerous charts.

The report consists of five sections. In the first, all accidents in the county of Nassau are analyzed; in the second, accidents are analyzed by townships; in the third and fourth sections, accidents are analyzed by villages; and the fifth section includes only accidents occurring in state parks and on state parkways.

Henry Root Stern is Chairman of the Nassau County Emergency Work Bureau, and Edward T. Devine is Executive Director. The accident survey was under the direct supervision of Archibald McKennee, Project Engineer.

How Slow Is "Slow"?

By EARL J. REEDER
Traffic Engineer, National Safety Council

IN spite of the fact that it is so often violated, there isn't much question about what "Stop" on a traffic sign means. It is specific.

But what does "Slow" mean on a slow sign? Or what does "Curve" mean? Shall the driver slow down to 20, 15, 10, or 5 miles an hour? Nobody knows what is in the mind of the man who installed the warning sign of either of these types unless the maximum speed is stated, and hence each driver uses his own judgment as to how slow is "Slow."

Every street corner across which there is any obstruction to view has its combination of critical speeds for traffic approaching the intersection from the two directions adjacent to the corner. These are the speeds below which drivers with normal reaction time of vehicles with normal brakes can approach the intersection in safety if they use ordinary care. Above these speeds the average driver's reaction time and the average vehicle's stopping distance cannot insure safety regardless of precautions.

Every curve has its critical speed based upon visibility, the degree of curvature, and super-elevation. It is that speed above which ordinary driving practices and skill may not insure control of the car by the driver.

I call these *critical* speeds rather than *safe* speeds because they are the marginal speeds between safety with ordinary care and hazard regardless of care, except for the unusual driver or the unusual vehicle.

In the case of certain street corners with an obstruction to view, the hazard may be so obvious that all drivers recognize it and no accidents result. Even under that condition, traffic movement may be improved if the obstruction to view can be eliminated; but safety will not be increased and, if the obstruction cannot be removed, there is no need for concern about the safety because accidents do not occur.

Where accidents have occurred and the collision diagram identifies a corner with obstructed view as the point of hazard, critical speeds of approach should be computed. After this is done, the driving public should be informed of these critical speeds, so that each driver may be individually warned by a specific instruction rather than an indefinite "Slow" sign. The slow sign may read "Slow to . . . Miles" or "Slow— . . . Miles Here."

When a highway curve is designed and constructed, the designer will, or should, consider the relations between curvature, super-elevation, visibility, and speed. If no appreciable reduction from normal speed is required, the average driver needs no warning except of the fact that he is approaching a change in direction, and the ordinary "Curve" sign is adequate. But if a reduction of speed is necessary for safety, the driver should be informed of the established critical speed by a sign, so that he may have no question about the appropriate speed as he approaches the curve.

Many an existing curve becomes hazardous as vehicle speeds increase and exceed its critical speed. Vehicles on the outside half often run off the roadway entirely, and vehicles approaching on the inside half collide with others from the other direction because their high speeds have forced them over the center line. Rear-end collisions of vehicles in the same lane sometimes occur when the view across the curve is obstructed.

Determining Critical Speeds at Intersections

The critical speeds at a street intersection are determined by the location of the obstruction to view. Figure 1 shows a typical right-angle intersection with an obstruction on the southwest corner. The higher the speed on one of these intersecting streets, the lower it must be on the other to prevent accidents.

Figure 2 is a diagram for graphically determining combinations of critical speeds for street corners with obstructed view. Normal right-of-way rules require the vehicle from the left to yield to the vehicle from the right if they are approaching at speeds that will bring them into the intersection simultaneously. In Figure 1, Vehicle A is approaching from the right and Vehicle B must yield if there is danger of collision.

Assume that the speed of vehicles from the south is not to be restricted below the legal limit. Assume also that the maximum observed legal speed of vehicles from the south, V_a, is 25 miles per hour. Place the upper right-hand corner of a card or sheet of paper on the left-hand "checkerboard" of Figure 2 at the point where "a," the distance from the path of A to the obstruction to view, is 39, and "b," the distance from the path of B to the obstruction, is 37. Then place a straight edge through the point representing 25 miles per hour on the scale for values of V_a, and along the point of the card. Where the straight edge crosses the scale for values of V_b corresponding to $V_a = 25$, we have 12 miles per hour. Shifting the straight edge to $V_a = 20$, $V_b = 17$ on the corresponding line.

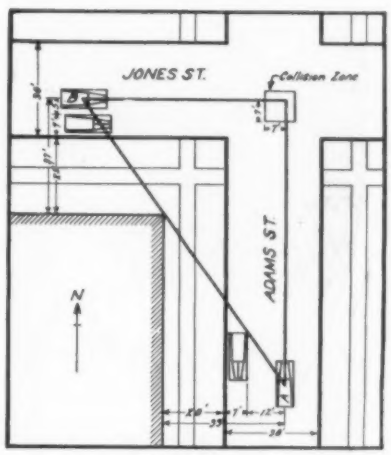
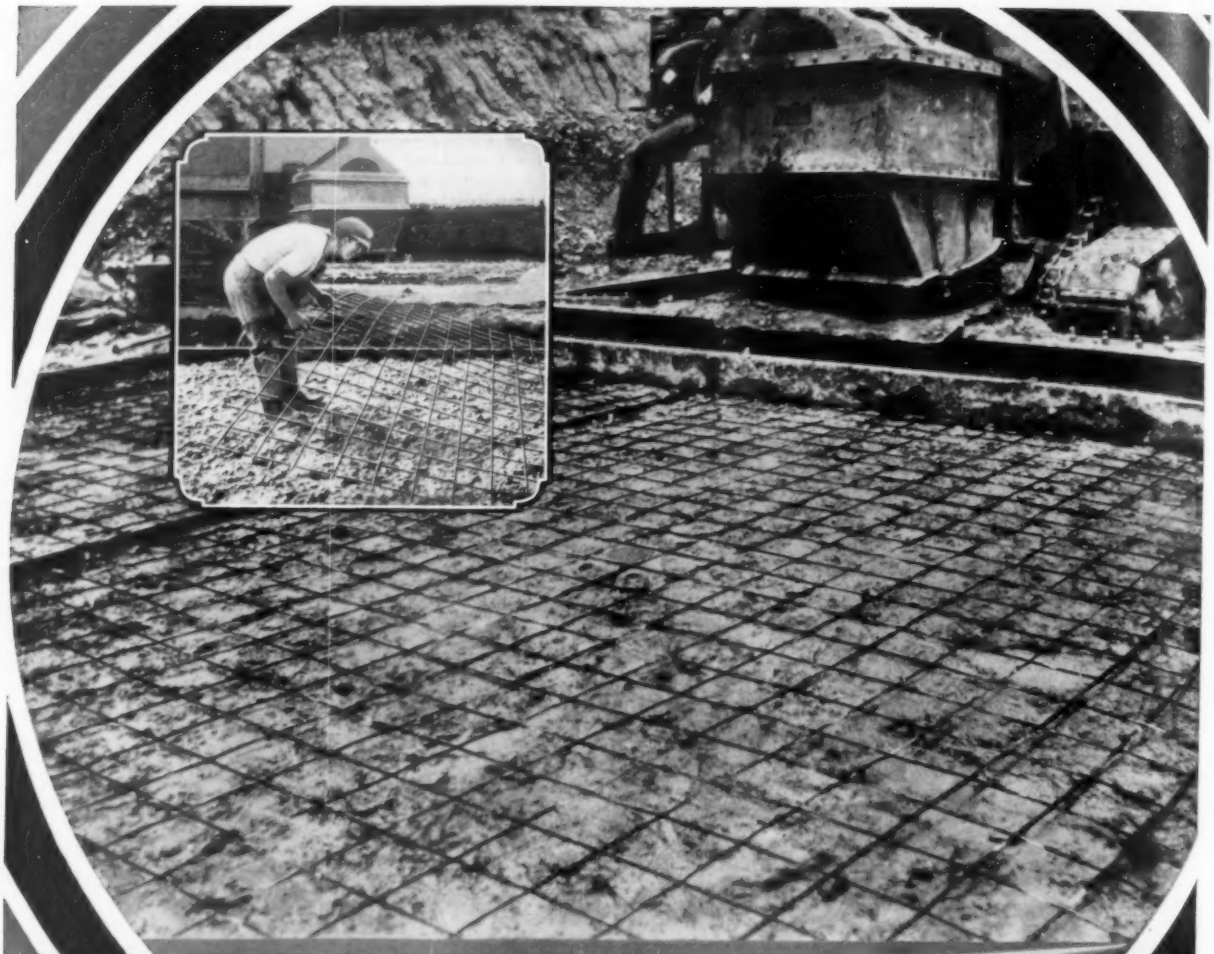


FIGURE 1

In the former case it will be necessary to place the speed restriction sign only on Jones Street to slow down vehicles from the west. In the latter case signs showing critical speeds will be required on both approaches unless observed maximum speeds from the west do not exceed 17 miles per hour.

Now suppose Jones Street is a major thoroughfare and vehicles on it are to be given the preference because it carries much heavier traffic than Adams Street. Then the values of "a" and "b" would be reversed and V_a would be the speed on Jones. Place the card representing the obstruction to view on the right-hand "checkerboard" at "a" = 37 and "b" = 39. Using the straight edge as above, when $V_a = 25$, $V_b = 13$; $V_a = 20$, $V_b = 18$; and equal critical speeds are 19 miles per hour.



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But how do I get the values of "a" and "b"? Simply by assuming the vehicles in their most hazardous legal positions in approaching the intersection. When the obstruction is at the left, I assume that the vehicle is 1 foot to the right of the street center line, placing its center half the width of the pavement plus 4 feet, from the left curb. When the obstruction is at the right, I assume the vehicle center to be 8 feet to the left of the curb where ordinarily there is no parking, 12 feet where there is parallel parking, and 20 feet where there is angle parking. These distances are added to the distances from the curbs to the obstruction.

The above disregards any obstruction to view by parked vehicles. But it is clear that in many cases parking can restrict the view across a corner much more than a building, some shrubbery, or a signboard on private property. While the card and straight edge are still on the diagram for any combination of speeds, the necessary parking restrictions to avoid obstruction to view can be determined. The values of "a" and "b" are the distances between the center lines of the moving vehicles and the near sides of the parked vehicles, allowing 7 feet for a line of cars at each curb where parking is a problem.

Referring again to the first case in Figure 1, "a" will be 12 feet for obstruction by a parked vehicle. The corresponding value of "b" for any combination of critical speeds gives the minimum distance that any vehicle should be parked south of the path of B on the west side of Adams Street. The same method can be applied to Jones Street where "b" would become 5 feet, the distance from the center line of B to the outside of the parked car.

The above examples have used a right-angle intersection. But the method applies equally well to an acute- or an obtuse-angle intersection if the value of "a" is measured parallel to the path of B, and the value of "b" parallel to the path of A. Then the diagram is used as for a right-angle intersection.

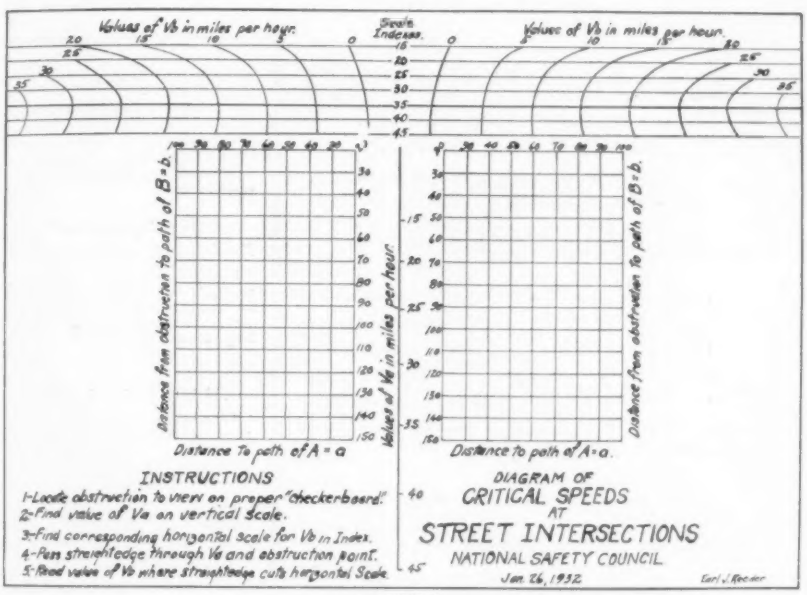

Values of Vb in miles per hour.
Scale Indexes.
Values of Vb in miles per hour.
Distance from obstruction to path of B=b.
Values of Vb in miles per hour.
Distance from obstruction to path of B=b.
Distance To path of A=a.
Distance To path of A=a.
INSTRUCTIONS
1-Locate obstruction to view on proper "checkerboard".
2-Find value of Va on vertical scale.
3-Find corresponding horizontal scale for Vb in Index.
4-Pass straightedge through Va and obstruction point.
5-Read value of Vb where straightedge cuts horizontal Scale.
DIAGRAM OF
CRITICAL SPEEDS
AT
STREET INTERSECTIONS
NATIONAL SAFETY COUNCIL
Jan. 26, 1932
Earl J. Rocker

FIGURE 2

By courtesy of Penn. Dept. of Highways

THE RESULT OF TAKING A CURVE WITH OBSTRUCTED VIEW AT HIGH SPEED

Unrestricted approach speeds can be checked by selecting a "trap" between two transverse lines in or on the pavement 100 to 200 feet apart and taking the running times of a number of vehicles with a stop watch. From the number of feet between the lines and the number of seconds, the speeds can be determined. The maximum speeds within legal limits should be used because they represent the dangerous conditions that must be safeguarded.

"Stop" Sign or "Slow" Sign?

In determining what kind of sign should be installed, a computed critical speed of less than 5 miles an hour should be interpreted to require a "Stop" sign rather than a "Slow" sign with indicated speed, because no vehicle may be expected to approach at so low a speed. For higher speeds the slow sign may show the actual critical speed in each case or, for greater standardization, the speed may be stated to the nearest multiple of 5 miles per hour, such as 10 or 15. Proponents of the latter method

By courtesy of Portland Cement Assn.

THIS SIGN WARNS THE DRIVER OF A CHANGE IN DIRECTION — BUT WHAT ABOUT SPEED?

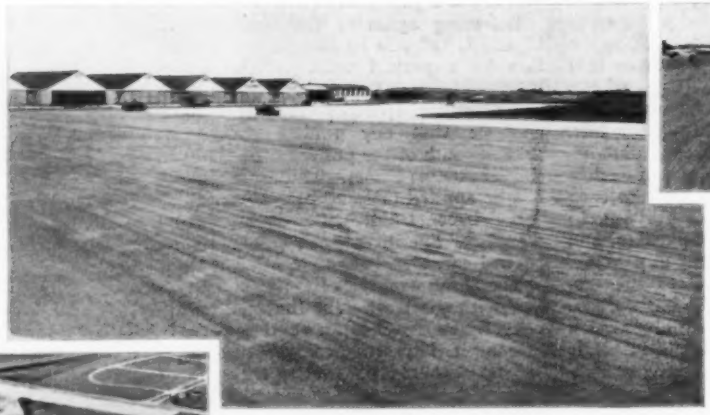
claim that the range of 5 miles per hour is about as close as any driver can come to a stated speed. On the other hand, there is a danger of the less accurate statement encouraging too much guesswork in the use of such signs. Until the public has become well accustomed to stated speeds on slow signs, I favor stating critical speeds to the nearest mile per hour.

According to Bulletin No. 18 of the American Road Builders' Association, the Department of Highways of the Commonwealth of Pennsylvania has made experiments to determine what they have called the "maximum safe speeds" for curves of different degrees with a superelevation of ¾-inch per foot. These are essentiallly critical speeds. For a 40-degree curve the critical speed was observed to be 33 miles an hour. For a 16-degree curve it was 45 miles, and for an 8-degree curve 60 miles.

The observations there reported were for a single vehicle and for unobstructed view. Changes in vehicle design, particularly those affecting the height of the center of gravity, will change these values somewhat. But when enough experiments have been made to determine good average performance of the normal driver and the normal vehicle, every existing curve, where the accident experience indicates that drivers do not recognize the hazards they approach, should be preceded by a sign indicating the critical speed.

The determination and posting of critical speeds are necessitated by the fact that improvements in highways and vehicles only accentuate the hazards of those danger points that are not clearly apparent. "Slow" now means a greater reduction of speed for safety at certain points than formerly. Accident records indicate that at many of these points the average driver feels that increasing the potential speed of his vehicle proportionately increases the critical speed at such points. But it does not, because his own performance is unchanged and often the street or highway conditions have not been changed. Hence, wherever the speed must remain low, the driver should be so informed by signs not merely giving the same warning as in former days, but indicating the critical speeds above which no ordinary precaution will insure safety, except for the unusual driver and the unusual vehicle.

for a
low cost
durable
Runway



Part of the completed surface at Roosevelt Field

Penetration of the stone wearing course at Roosevelt Field

The Colas runways at the Municipal Airport, Joliet, Ill.

COLAS *leads* *in* MODERN AIRPORT CONSTRUCTION

COLAS is an emulsion of pure asphalt. It is applied cold and it has many important advantages. COLAS insures an economical distribution of pure asphalt throughout a consolidated wearing surface. It will make durable, dustless, long-life wearing surfaces with rock, slag, gravel, or whatever happens to be the most suitable local material. COLAS construction requires a minimum of equipment.

Colas aprons at the Glenn H. Curtiss Airport, North Beach, L. I.

Construction of aprons at the Cleveland Airport, Ohio

FIRST COST IS LOW—

Maintenance Expense a Minimum

In addition to the advantages of a surface that is smooth, resilient, durable, dustless and unharmed by tailskids, COLAS runways are laid at a really low first cost.

A hangar floor at the Newark Airport, New Jersey

Colas runway at the Chicago Municipal Airport

Colas penetrated gravel surface at the Curtiss Airport, Milwaukee, Wisconsin

Methods of Construction

The nature of the field, the best and cheapest local aggregate, the amount of traffic involved, are all factors that bear upon the type of construction recommended. Estimates will be submitted taking into consideration your local conditions.

Warming-up Areas, Roads, Aprons and Hangar Floors

In addition to the surfacing of runways and taxiways, COLAS is equally suitable for airport roads, warming-up areas and hangar aprons. COLAS may also be used to advantage for hangar floors.

Advisory Engineering Staff

COLAS engineers with practical airport construction experience are available to advise you relative to your airport problems. Recommendations and estimates of costs will be gladly submitted without cost or obligation.

Exceptionally Resilient . . . No Shock on Landing

Extracts from a letter by a manager of a well known airport:

"Further to your request to me on the occasion of your visit to this airport in the interests of ascertaining the practicability of COLAS penetration treatment of runways with which this airport is equipped, I wish to advise that my personal experience with them has been most satisfactory. I find them to be exceptionally resilient, giving off practically no shock on landing. They are very good with regard to traction, and planes equipped with brakes find no difficulty whatever in maneuvering in high winds.

"Pilots on the regular mail runs who have had occasion to use them for the past six months find them most satisfactory and are warm in their praises. I have found little or no tendency to exert a twist effect on the under gear in the event of cross-wind landings or take-offs. You will of course agree with me that this is largely a matter which is directly affected by the pilot's ability in such matters.

"I also find that these runways are softer than turf; this is probably due to the fact that they are so smoothly laid, whereas the turf is bound to have certain undulations which it is most difficult to overcome."

COLAS
REG. TRADE MARK

SHELL OIL COMPANY
SAN FRANCISCO
SHELL PETROLEUM CORPORATION
ST. LOUIS
SHELL EASTERN PETROLEUM PRODUCTS, INC.
NEW YORK CITY
Licensees of Colas Roads, Inc., New York City

"COLAS BUILDS DURABLE, LOW-COST RUNWAYS"

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

City Acquires Historic Beauty-Spot by Gift

SAN FRANCISCO, CALIF.—An historic landmark is to be preserved in San Francisco through the generosity of Mrs. Sigmund Stern, President of the Recreation Commission, who has given to the city a large portion of the famous old Trocadero Rancho at Nineteenth Avenue and Sloat Boulevard. The gift comprises three city blocks and was presented as a memorial to the donor's late husband, Sigmund Stern, for many years a prominent civic leader of San Francisco.

The work of developing the area as a recreation center is already under way. Bernard I. Maybeck, one of the nation's foremost architects, whose Fine Arts Palace at the Panama Pacific International Exposition was acclaimed as one of the most beautiful dream structures ever erected, is consulting architect for the project. The work is being executed by Gardner A. Dailey.

The three blocks comprising the gift are situated in a wooded dell that forms a natural bowl, said to be ideally suited for open-air concerts, pageants and other forms of recreation. The fact that the tract is walled in on two sides by high slopes, which in turn are heavily wooded by groves of 50-year old eucalyptus, gives the bowl a sheltered protection which makes it the warmest outdoor area in San Francisco. Those who have studied its climatic advantages declare that it is fully ten degrees warmer than the rest of San Francisco.

The Sigmund Stern gift comprises the entire dell. At the present it has an approach from Nineteenth Avenue just north of Sloat Boulevard. The plans call for a similar approach, however, from Wawona. Automobiles will be prohibited, the park being reserved for pedestrians only. The dell will be a unique addition to San Francisco's recreational attractions.

The property forms an integral part of San Francisco's colorful past. A famous old house, said to be one of the first built in San Francisco, which for a number of years was operated as the Trocadero Inn, is still standing and with reconditioning will be available as a club-house.

JOHN McLAREN,
Superintendent of Parks.

Telephones and Movies Help Unemployment Relief

HOUSTON, TEXAS—In the midst of the unemployment crisis it is refreshing to realize that our Community Chest always rises to its quota, and that emergency gifts of every kind are numerous. Yet there are people who will suffer the pangs of cold and hunger before they will allow themselves to be classed as objects of charity. They ask not charity but a chance to make an honest living. People of education and training will descend from their stratum to the level of a laborer, if need be, rather than accept charity. It is in his service to these that Will Horwitz stands forth a unique figure in our community.

Mr. Horwitz has erected a mammoth tent near Sam Houston Hall in which he conducts a free employment bureau. Each applicant's name is entered in a register under the class or kind of work he is able to do. Two telephones are used exclusively for calling the homes and business establishments in Houston every day to ascertain whether there is a job on which an extra man could be used. If a request for help in any line is the answer, the request is immediately telephoned to the manager at the tent, who selects a competent individual from the proper class and rushes him to the place where he is wanted. In addition to this use of the telephone, the city of Houston has been placarded from center to circumference with notices asking people to call up the employment office for any needed help.

Mr. Horwitz operates three motion picture theaters, and at each performance the same plea is made to the public via the screen. Every Friday in each of these theaters a "Tin Can Matinee" is given. This means that anyone who presents a tin of canned food is admitted between 10 a.m. and 6 p.m. The average number of cans received each Friday is 2,000. Nor are these donations confined to cans. They range from a ten-cent package of tea to a butchered ox, kept in cold storage and distributed as needed.

One significant result of these and other benefactions has been the lessening of petty crimes in the community.

C. S. PERRY.

Regulation of Boxing and Wrestling Matches in Memphis

MEMPHIS, TENN.—The Recreation Department of the Memphis Park Commission does not promote boxing and wrestling matches on the playgrounds and in the community centers, but permits them to be arranged by older boys, with the help of a committee of men in the neighborhood of each playground or community center, who sponsor the activity and who accept responsibility for the physical examination of participants.

WOODED DELL IN TROCADERO RANCHO, SAN FRANCISCO

The following rules and required information apply to boxing and wrestling matches in our community centers:

1. Name of club.
2. Object.
3. Officers.
4. There should be an advisory committee at each center, composed of older residents in the respective communities, who will foster these sports and will be responsible for the deportment of the spectators and contestants. This is to relieve the Recreation Department, Memphis Park Commission, from any unjust criticism.

. . . SO $'S CAN COME TO TOWN

OUT past the pavement's end in a big western city, this "Caterpillar" Auto Patrol smooths the roads that lead toward Main Street. With one stretch patrolled, it rambles over to another "feeder" at 10 miles an hour. Then another bumpless beat soon proclaims to the motorist that there's a live town ahead. Thanks to a strong, non-chattering blade and ample power!

Dollars — itching to buy merchandise—roll into market. Other precious dollars — invested to give the taxpayer value received —do, and keep on doing, an appreciated duty.

"Caterpillar" Tractors, Graders and Maintenance Machines are available in sizes and types to suit every city's needs. Ask your "Caterpillar" dealer for complete information.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.
Track-type Tractors Road Machinery
Combines
(There's a "Caterpillar" Dealer Near You)

BOXING MATCH AT MALONE PLAYGROUND, MEMPHIS

(In other words, we want those in each individual community to be in sympathy with what the Recreation Department is doing regarding athletic activities.)

5. Consideration should be given the safety and welfare of the principals in the matches.

6. There should be a match-maker who will make the matches according to division, weight and ability; a club physician who will look after the boys' physical condition, making an examination of heart, pulse, etc., before letting them enter the ring.

8. An inspector who will look after the boys' hands to see if they are properly taped, will have supervision of the gloves, and will also weigh the boys so as to insure their opponents of getting a fair deal; see that there is proper training.

9. A time keeper who is reliable and will not be so prejudiced or interested in the matches that the contestants will go over the scheduled time. In any event, the junior boxers should not be allowed to fight more than two-minute rounds and should be limited to not more than four rounds; have a competent referee who is capable of handling any situation and will stop the match if the boys become too rough or the eyes or other parts of the bodies of the contestants are in danger.

10. Permits should be filled out and properly signed by the parents of the contestants, giving their consent for them to box or wrestle. These in turn should be O. K'd by the inspector.

11. There may be a publicity man, financial secretary, membership secretary and president.

MINNIE M. WAGNER,
Superintendent of Recreation.

Outstanding Success of Municipal Auditorium Due to Convertible Features

NEW ORLEANS, LA.—The new $2,500,000 municipal auditorium in New Orleans accomplishes an exceptional flexibility of use through the medium of a disappearing stage, orchestra pit and partition. The main building measures approximately 200 feet by 320 feet and has a seating capacity of 12,000. (There is an exhibition annex 320 feet by 70 feet.) The central removable stage and partitions when in place convert the main auditorium into two sections—a concert hall with a seating capacity of approximately 3,500, and a smaller auditorium seating approximately 6,500. By manipulation of the partitions the two sections may be used simultaneously with the stage—a part of either the one or the other.

The conversion is accomplished within a few minutes by the simple use of push-buttons conveniently placed in a central location. These are connected with electric motors and controls, each individual part having its own individual drive.

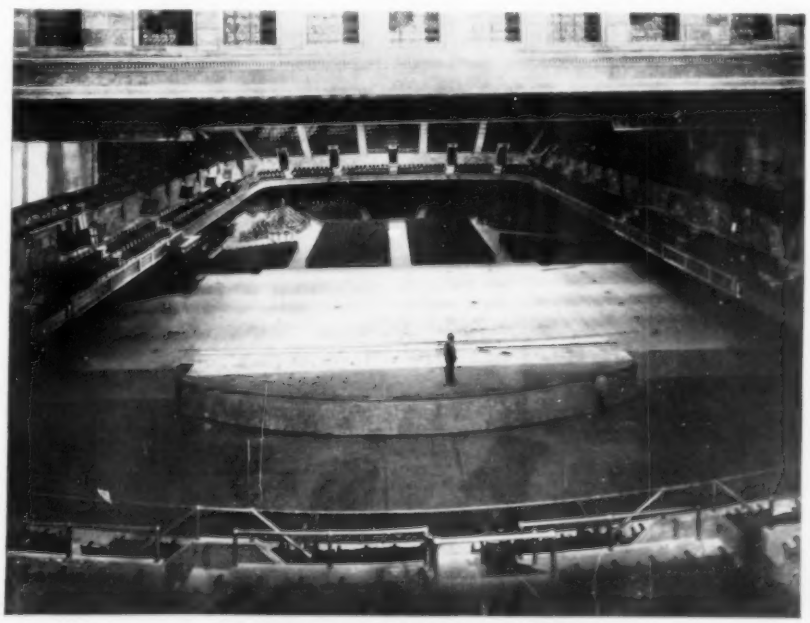
The stage, 129 feet long and 50 feet wide, is lowered and raised by a series of jack-screws, mechanically connected and centrally driven by a single motor. The partitions consist of eight sound-proof, movable walls with provisions for a proscenium arch and curtain. They weigh approximately 80 tons, and are lowered from the ceiling and guided into place by mullions. Ceilings, walls and mullions must move in proper sequence. When the large auditorium is to be divided, the ceiling must first be opened and placed in proper position to receive the mullions. The mullions are then lowered and placed. Then come the walls. When the two halls are to be reconverted into the one large auditorium, the ceiling is again opened, the walls raised, and the mullions removed. The ceiling is then closed, and neither the portable equipment now all above the ceiling line—nor the opening, is visible.

Stage and orchestra pit may be operated independently of the partitions, within the limitations placed by the multi-contact limit switch, the function of which is to control operation of all parts and to insure their positive interlocking. All movements of the various parts are handled through a remote-control push-button panel made up of twelve groups of three buttons each. Each group is marked to show the particular section it controls, and the three buttons in each group are marked "Raise," "Lower," and "Stop." There is also an emergency stop button. The whole has been devised upon an accident-proof plan. Buttons must be pressed in proper sequence, and the movable parts must be in proper position for moving, or nothing at all happens.

Financially, the auditorium has justified itself, inasmuch as the income obtained from its rentals has more than offset the cost of operation. The flexibility of use feature has made the building a distinct asset to the city, since practically every sort of public attraction can be appropriately shown there. The building has won prestige for itself and for the city because of its interior design. Consulting engineers, architects, and municipal officials from various parts of the country have given it their unqualified approval and praise.

General Electric motors are used. The installation of the movable equipment was made by the Allen and Drew Co., of Boston.

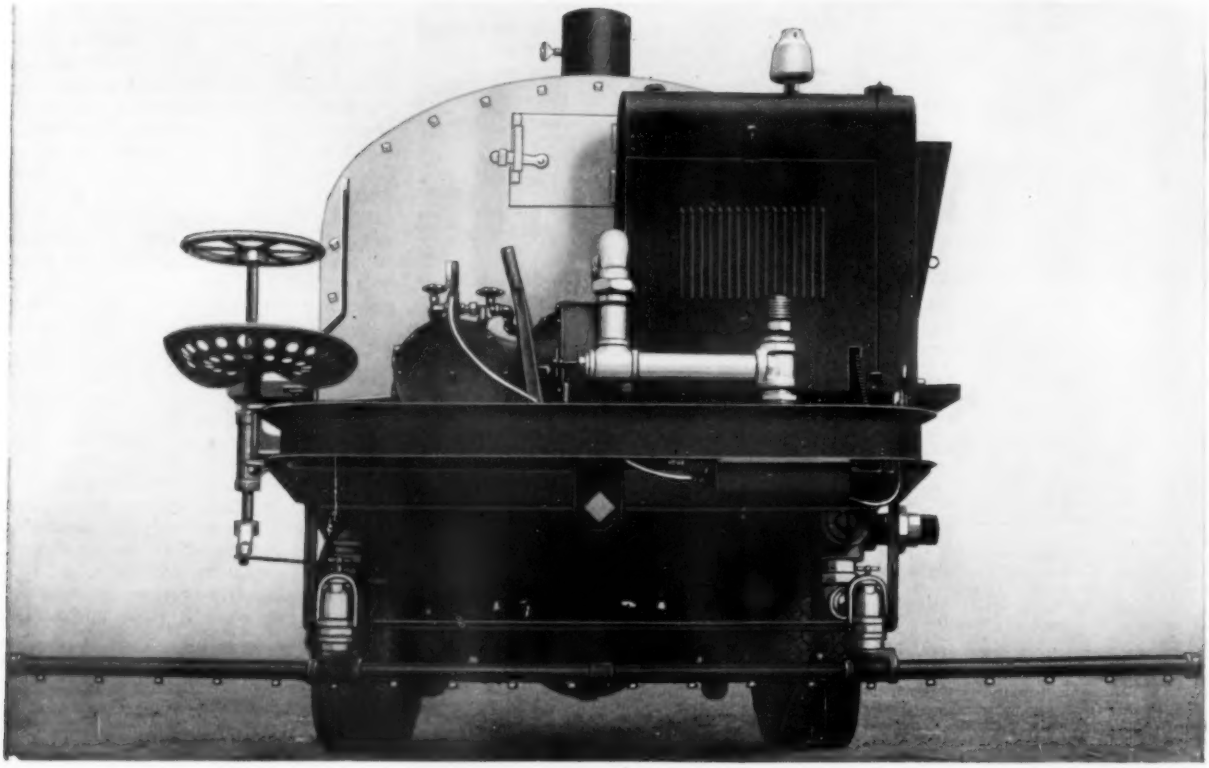
K. S. FOSTER,
Civic Secretary, New Orleans Association of Commerce.



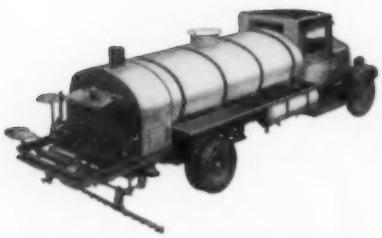
MUNICIPAL AUDITORIUM, NEW ORLEANS
Interior view showing central floor and stage in position

ANNOUNCING

the Littleford Distributor



with Single Valve Control



A Single Valve controls all operations of the Distributor; i. e., fills the tank, circulates material as it is heated, distributes material to the road, and drains all lines when operations are finished

The Littleford Pressure Distributor was exhibited last January at the Detroit Road Show of the American Road Builders' Association. Its Single-Valve Control, Low-Pressure Oil Burner, Heat Chamber and other features were enthusiastically gone over and exclaimed about by road men. This was a pre-announcement showing.

Now we are ready to give you complete information and prices on what we have reason to believe is the finest Distributor available for the application of asphalt, tar, road oil, cut-back and emulsions.

It will be a great pleasure to us to receive your request for detailed information so that we may tell you all about the Littleford Pressure Distributor.

THE SIGN OF A GOOD HEATER LB LITTLEFORD BROS. CINCINNATI, OHIO

LITTLEFORD

Road Maintenance Equipment

SINCE 1900

LITTLEFORD BROS. 500 **E. PEARL ST. CINCINNATI, O.**

Reg. U. S. Pat. Off.

Unemployed Direct Traffic

UTICA, N. Y.—Fifty men registered at the Utica work bureau were given employment here recently regulating traffic near the Utica schools. The plan was outlined at a conference attended by Walter F. Hudson, Director of the Bureau, Earl S. Shartzer, Chairman of the Utica Safety Council, Curtis F. Alliaume, Commissioner of Public Safety; Mrs. Priscilla Marble, Manager of the Safety Council, and John A. DeCamp, Superintendent of Schools.

They will work under the supervision of the principals and be paid from the Work Bureau fund.

ELLIS K. BALDWIN

ADVERTISING MUNICIPAL ELECTRICITY

The electric department of the Lansing, Mich., Board of Water and Electric Light Commissioners has erected this sign over a fire station at the dead end of a downtown street. The word "Electricity" is in double-tube neon; the others are made with helium-filled tubes, giving a yellow effect. "Fast—Clean—Cheap" are flashed in succession, then all remaining on for a minute. See Outdoor Lighting section at page 151 regarding Lansing's street lighting

Safety Gates for School Crossings

THE schoolboy patrol system has recently become a factor of considerable importance in the effort to reduce the heavy toll of accidents to children on the streets. But the patrols run the risk either of accidents to themselves if they stand in the midst of traffic, or of being ineffective if standing on the curb.

A school traffic gate operated from a position of security on the sidewalk, is a new form of aid for the patrols, and is reported to be in use in several Ohio communities, the original installation having been made in Middletown, where the device was developed by the Barkelew company of that city.

It is composed of two black and white striped barriers, one that lowers into the street to control motor traffic and another that swings across the sidewalk to hold the school children back until the motorists are safely stopped.

The street barrier is a large bamboo pole that reaches approximately to the center of the street, with a red and white metal stop sign attached to its outer end. This black and white pole drops across the driver's line of vision, arresting his attention and giving him sufficient time to come to a complete stop before the gate is all the way down. It is lowered by a weighted handle which a schoolboy can easily operate. The two are interlocked so that when one is open the other remains closed. Two gates are used at each crossing, one on each side of the street, to stop traffic in both directions.

SAFETY GATES, MIDDLETOWN, OHIO

Recent City Manager Appointments

WILLIAM J. BLAKE, City Engineer of Newburgh, N. Y., for the past twenty-five years, has been appointed City Manager of that city, effective May 15, to succeed William J. McKay.

Seth Burnley, County Manager of Albemarle County, Va., since January, 1931, became City Manager of Charlottesville, Va., on March 22, succeeding H. A. Yancey, now City Manager of Petersburg, Va. Mr. Burnley, graduate in civil engineering from the University of Virginia, has held positions with the Delaware Highway Department, and with Newcastle County and Richmond, Va.

R. L. Cooper, City Manager of Albuquerque, N. Mex., from 1926 to 1931, was recently appointed the first City Manager of Port Arthur, Texas. He is a graduate of Colorado Agricultural College, and from 1919 to 1926 engaged in highway engineering and construction.

R. B. Dean succeeded A. B. Cutter as City Manager of Cape May, N. J., in April. Mr. Cutter had been City Manager of Cape May since January, 1931.

John W. Dent succeeded R. C. Poindexter as City Manager of Cartersville, Ga., recently. Mr. Poindexter had held that position since 1930.

Hale A. Guss, former City Manager of Jeannette, Pa., became the first manager of Northampton, Pa., on March 15. From 1911 to 1929, when he was appointed at Jeannette, Mr. Guss was engaged chiefly in mining engineering.

P. R. Keller succeeded Herbert A. Thomas as City Manager of Camden, Maine, on March 15. He is a graduate of the University of Maine, and has been with the Maine State Highway Commission for eighteen years, as supervisor of state aid and third-class roads.

Frank T. Mahar, Assistant Superintendent of County Buildings, Albany County, N. Y., was recently appointed City Manager of Watervliet, N. Y., succeeding Robert J. Murray, who had served as City Manager for eight years.

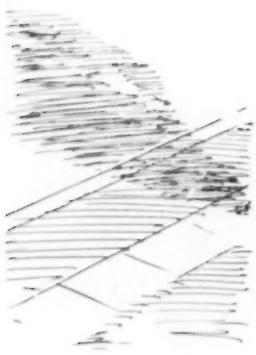
G. C. Pierce succeeded W. M. Slopansky as City Manager of Belleville, Kans., on May 1. Mr. Slopansky, who resigned to become a candidate for election to Congress, had been City Manager since May, 1921.

Herbert A. Thomas, City Manager of Camden, Maine, since March 1925, was appointed the first City Manager of Mount Desert, Maine, effective March 15.

CLARENCE E. RIDLEY,
Executive Director, The International City Managers' Association.

EFFICIENT SWEEPING IN UNIVERSITY CITY, MO.

Street cleaning in this St. Louis suburb prior to the purchase of this Austin motor pick-up sweeper in 1929 cost $11.51 per mile of street by hand. The present cost is only $1.00 per mile with the machine



FORT WORTH, TEXAS

To lower expenses in order to keep within a reduced budget and yet maintain a proper street cleaning schedule was the problem in the city of Fort Worth. Two AUSTIN Motor Sweepers were the answer!

Replacing three old, obsolete sweepers, the two new AUSTIN Motor Sweepers are doing twice as much work as was formerly done, averaging 120 miles of gutter sweeping per day.

Your streets must be kept clean. The cleaner the better. Your business streets should be cleaned every day in the early morning hours; your residence streets at least twice a week. Streets kept thoroughly clean mean a more healthful community—and a most favorable impression on visitors and passing motorists. Clean streets are a stimulus to civic pride and a major factor in civic growth.

An AUSTIN Motor Sweeper costs only $10.50 a day to operate, including labor, and will easily clean 60 miles or more of gutter.

Investigate the AUSTIN Motor Sweeper—latest refinements, including pneumatic tires, make it the logical street cleaning choice of every modern city—send for Catalog No. 11.

The Austin-Western Road Machinery Company, 400 North Michigan Ave., Chicago, Ill.

358

The Austin-Western ROAD MACHINERY CO.

ROAD ROLLERS, CRUSHING & SCREENING PLANTS, SCARIFIERS, SWEEPERS & SPRINKLERS, ROAD GRADERS, ELEVATING GRADERS. MOTOR GRADERS, PLOWS & SCRAPERS, ROAD OILERS, ROAD DRAGS, CULVERTS, SHOVELS & CRANES, DUMP WAGONS, SNOW PLOWS.

A Possible Pathway Out of the Slums

IN our attempts to solve the housing problem in England, I have been advising that we should not always look to a choice between absolute government or municipal government and absolute private enterprise, but that we should try to encourage cooperation between the two. I should like to see in this country a strong board operating on the lines of public utility societies and receiving some government backing, so that they could raise capital on the lowest possible rate of interest, and government and municipal cooperation in every other way. Not only for building is this desirable, but also, I think, for holding and managing. Houses owned by a municipality could be handed over to boards similarly constituted. The scheme would benefit by good management, leaving the ultimate ownership with the local authority, and paying a reasonable annual return to the local authority. Any money which they could save by better management, more careful repairs, etc., they might be allowed to capitalize for the purpose of building fresh houses, or bringing up to date slum dwellings.

I do not think that we shall ever get, either in this country or in yours, an adequate solution to the housing problem, if it is left entirely to be worked out on a commercial footing. The builders and owners of property are always too vitally interested first in keeping the supply of houses below that which is socially desirable, in order that rents may be maintained; and equally interested in maintaining in occupation old houses long after their condition has deteriorated, which they are able to do owing to the relative scarcity of new houses. I was in favor of direct subsidy to the building of houses, so long as artificially high prices, due to the war, were ruling; but I am inclined to favor a direct subsidy to rent in some form or other, where normal prices are ruling, as enabling any funds available for subsidy to be entirely devoted to the cases where assistance is needed; and this would be greatly assisted if the houses were held by managing boards, who could exercise some discrimination in regard to rents, and indeed might usefully employ any profits they could make in this direction for the present.

Unless the international financial situation is thoroughly cleared up very soon, I am beginning to contemplate the necessity of trying to organize our unemployed workers to undertake slum clearances as a definite crusade, organized and maintained outside the ordinary commercial and financial structure, which has so completely broken down. But that, however, is something for the future, and I still hope that the nations will come to their senses in time to avoid the necessity for such steps.

RAYMOND UNWIN.

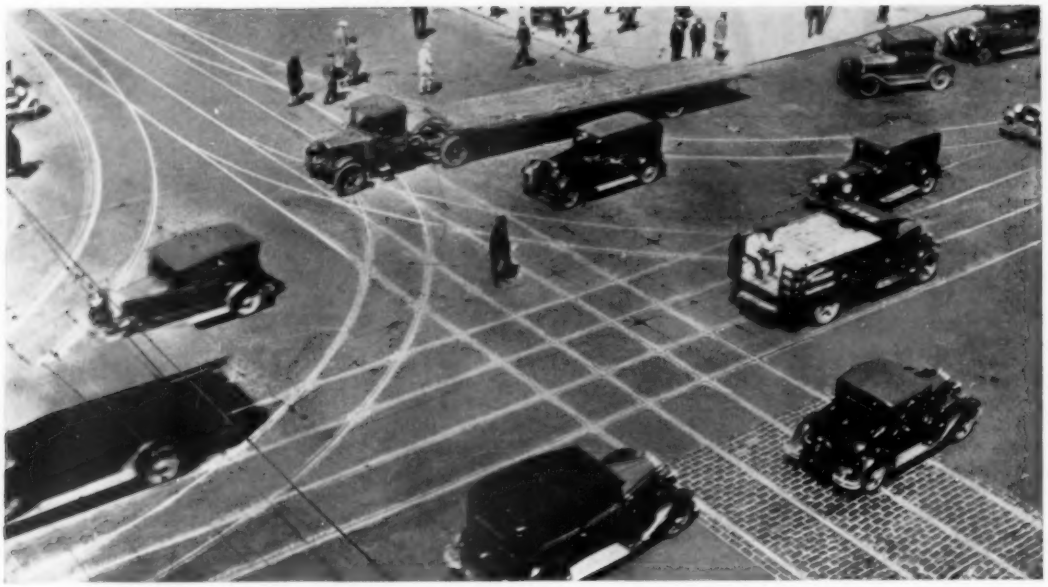
(From a recent letter received by the Editor of THE AMERICAN CITY from Mr. Unwin, who is the President of the Royal Institute of British Architects, and one of England's foremost town planners.)

Kansas City Visualizes Four Years of Development

THIS new city, costing $50,000,000, was constructed in Kansas City, Mo., in the past four years, a development for which much credit is given to an Industrial Expansion Program conducted by the Chamber of Commerce there. The new city, to be sure, was not an integral unit, as pictured. The composite view was devised to impress graphically upon the minds of Chamber of Commerce members what their contributions in the four-year period had gained for their community. This picture was one of the "principal arguments" used in a refinancing campaign.

Under the presidency of Conrad H. Mann, now serving his fourth term, the Chamber of Commerce expended in excess of $50,000 yearly in national advertising alone, and an additional sum for sectional and other advertising.

Kansas City is proceeding today with a $40,000,000 municipal and county building program. Bonds were voted a year ago after a thorough campaign by a citizens' committee of one thousand, Mr. Mann being chairman.



Time tells the truth

TIME HAS PROVED that Westphalt makes a lasting street surface. This improved asphalt paving material has stood the test of time under heaviest traffic conditions in 12 states with widely different climates. Everywhere it has provided smooth, noiseless, resilient surfaces since the day it was laid.

TIME HAS PROVED that Westphalt is economical to lay. Careful checks over a number of years have shown that, being ready-mixed and heated on the job, by a simple oil torch, Westphalt saves time and labor. No hot mix plant is needed.

TIME HAS PROVED that Westphalt quality is uniform. Samples, representative of each day's run, go through rigid laboratory tests to assure a constant content.

Use Westphalt anytime, anywhere for new construction, resurfacing old streets or patching.

Now's the time to write us for complete information and specifications.

WEST PROCESS PAVEMENT CO., INC., Louisville, Ky.

The Photo

The illustration shows the intersection of Woodward and Jefferson Avenues, Detroit, Michigan, which was repaved at night with Westphalt at a temperature of 15 to 25 degrees. Westphalt is unsurpassed for quick, lasting resurfacing in any weather.

Specify Westphalt

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West Process Pavement Co. of Va.
Richmond, Va.

Tenn. Westphalt Co.
Chattanooga, Tenn.

R. G. Lassiter Co.
Raleigh, N. C.

Central Westphalt Pavement Co.
St. Louis, Mo.

The Municipal Bond Market

By SANDERS SHANKS, JR.
Editor, *The Bond Buyer*

RECENTLY, there have been a number of favorable developments which have not yet been reflected in market quotations for municipal securities. The operations of the Reconstruction Finance Corporation and the aggressive government bond-buying policy adopted by the Federal Reserve authorities have been distinctly helpful to the banks. This means that the banks are placed in a better position to resume normal credit relations with municipalities in their locality in connection with temporary financing of anticipated and delinquent taxes.

Extremely important is the Illinois Supreme Court decision upholding Cook County-Chicago tax assessments, thus breaking the back of the "tax strike" which has caused a breakdown in the financial machinery of the second largest city in the country and led investors to question the security of municipal bonds generally.

At approximately the same time the Illinois Court was restoring confidence in the financial soundness of Chicago, the United States Supreme Court acted on the famous Allen County, Ohio, case on the outcome of which rested the validity of some $2,000,000,000 of Ohio municipal securities. By dismissing the appeal from the ruling of the Ohio Supreme Court upholding the bonds, another very black cloud which has been hanging over the municipal bond market is dispersed.

The outlook for a sharp increase in Federal income tax rates, from which municipal bond interest is exempt, is of course a definitely favorable factor.

Authorities of cities, or other municipal subdivisions, who have carefully appraised the situation appreciate that it would be reckless to proceed on the theory that an early substantial improvement in bond prices is in sight. Until there is a very definite upturn in business, local government units must expect to continue to have difficulty in finding sufficient revenue to meet ordinary expenses, plus emergency relief work costs at a time when all revenues are below normal. So long as this condition prevails, bond buyers will continue to be skeptical of the ability of local governments to keep budgets in balance—or, in other words—to find enough money to pay their debts without piling up deficits. On the other hand, accompanying any improvement in the municipal situation which may develop in the future, it is likely that the volume of new borrowing will be sufficiently large to act as a brake on prices.

The following is a list of recent sales of new issues of state and municipal bonds, showing the net interest rate at which the loans were placed:

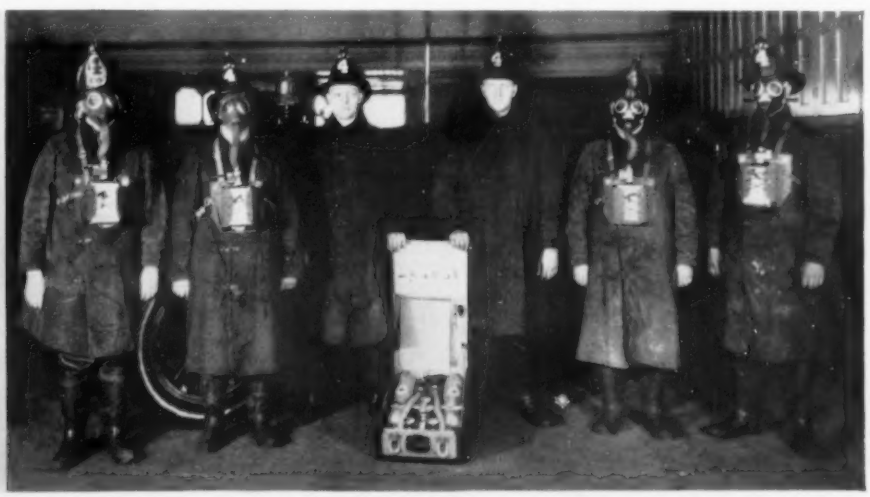
Amount	Municipality	Rate (%)	Maturity	Net Basis (%)
$2,765,000	Massachusetts	3½, 4 & 4½	14 5/6-yr. (avg.)	3.928
350,000	Allentown, Pa.	4¼	13 5/6-yr. (avg.)	4.24
250,000	Baltimore Co., Md.	4½	21 2/3-yr. (avg.)	4.37
50,700	Norwood, Mass.	4½	7 1/3-yr. (avg.)	4.44
3,000,000	Providence, R. I.	4½		4.52
400,000	Greenwich, Conn.	4½ & 5	12½-yr. (avg.)	4.64
147,000	Elmira, N. Y.	4.70	4 5/6-yr. (avg.)	4.67
1,919,722	Minneapolis, Minn.	4¾	5 1/3-yr. (avg.)	4.71
180,000	Wichita, Kans.	4¾	10-yr. (avg)	4.86
1,000,000	Los Angeles, Calif.	5	1-10-yr. (ser.)	4.99
125,000	Menasha, Wis.	4¼	4 2/3-yr. (avg.)	5.18
100,000	Trumbull Co., Ohio	5¾	5¾-yr. (avg.)	5.68
1,440,000	Kearny, N. J.	6	22½-yr. (avg.)	6.00
1,073,000	North Hempstead, N. Y.	6	22 1/3-yr. (avg.)	6.00
9,000,000	Tennessee	6	14¼-yr. (avg.)	6.00

Montreal Fire Department Active in Salvage and Inspection Work

FOUNDED as a full paid corps in 1863, the fire department of Montreal, the metropolis of Canada, has kept pace with progress. Today it is well equipped with modern apparatus, and has a personnel consisting of 1,100 officers and men, headed by Chief Raoul Gauthier, who, starting as a fireman at the age of 22, has grown up with the department, and has been chief since 1923. There are 48 fire stations, housing 115 pieces of apparatus.

An active and much appreciated branch of the service is the Salvage Corps, made up of six salvage cars, each manned by two lieutenants and six men, double shift, under the captain of the corps. All cars are equipped for emergency work and carry Burrell all-service masks and H-H inhalators, in addition to waterproof covers, hand extinguishers, brooms, pails, etc. The men are trained in artificial resuscitation, and are proficient with the inhalators. Masks of the same type are also carried on twelve ladder wagons. In 1931, the Salvage Corps answered 3,137 calls and laid 10,401 covers. The department has the exclusive services of a doctor. Ambulances from the various city hospitals respond immediately to second-alarm fires.

The Fire-Prevention Bureau, composed of 30 inspectors, made 100,000 inspections of public, industrial and commercial buildings during 1931, and 5,000 corrections were made at their suggestion to enforce municipal fire-prevention by-laws. With the cooperation of the general public on prevention lines and excellent work of the Fire Department under Chief Gauthier, Montreal is coming to the front in security against fire.



LEFT—FIRE CHIEF RAOUL GAUTHIER, MONTREAL. RIGHT—SALVAGE CREW OF NO. 4 STATION, WEARING GAS MASKS

"Our brick pavement withstands the ravages of time splendidly. The maintenance during its life has been negligible." —T. E. Myers, Vice-Pres., Indianapolis Motor Speedway Corp.

22 YEAR OLD BRICK PAVEMENT

Still Serving Auto Racers

Brick re-surface on Speedway track laid in 1909 . . . O. K. for 1932 Motor Classic

Above—
Scene at the Speedway as the race begins.

Insert—Close-up view of the brick surface at Speedway over which the fastest cars will compete.

MEMORIAL DAY 1932! Another big Motor Race at the Indianapolis Speedway!

The first pavement laid on this famous course was not brick. It showed signs of failure after the first race.

Over that failing pavement, in 1909, was laid the present brick surface. And there it is today ready for the 1932 races.

Compare the record of this 22-year old brick pavement that carries the fastest traveling cars in the world with other pavements. Excepting brick, what pavement can withstand twenty-two years of exposure to the weather? Excepting brick, what pavement has a negligible upkeep?

The original idea of the Speedway Races was a proving ground for the development of motor vehicles. It has been.

But it has also been a proving ground for testing the life of pavements. The experience of the Speedway Corporation and its brick pavement checks with the experience of cities and states that have built their pavements of brick.

For information on Brick Pavements, write National Paving Brick Association, 1245 National Press Building, Washington, D. C.

BRICK—the Pavement that Lasts

Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

Zoning—Procedure

CALIFORNIA.—*Schofield v. City of Los Angeles*, 7 Pac. 2d, 1076.—A zoning ordinance, passed by the Council of Los Angeles without being submitted to the City Planning Commissioners, as required by the city charter, is void.

Private Covenants

DELAWARE.—*Reiver v. Voshell*, 158 Atl. 366.—The owner, subdividing land and conveying houses and lots to several grantees with easements over an alley, could not thereafter legally sell to another, whose title was derived from a stranger, a right-of-way over the alley equal in terms to that enjoyed by his previous grantees; in spite of the fact that there was no express grant of exclusive use to these prior grantees, since the surrounding facts imply that such was the grant.

Non-Conforming Use—Extension

KENTUCKY.—*Carrithers and Son v. City of Louisville*, Jefferson Circuit Court, Chancery Branch, Second Division, March 12, 1932.—Before the adoption of the existing zoning ordinance, placing the land in question in an "apartment" district, the plaintiffs had built a structure and were using it for a milk products business; and since the enactment of that ordinance have continued it as a non-conforming use. The ordinance permits the continuance of such a use in an existing building, and its extension throughout it, if no structural changes are made.

After the adoption of the zoning ordinance, the city passed an ordinance imposing, in the public interest, certain additional requirements upon the class of business in which the plaintiffs were engaged. It was impossible for the plaintiffs to continue their business in the building as it then was, and they applied to the Board of Adjustment for a variance to allow them to enlarge their building. The Board refused to grant the variance, on the ground that the proposed enlargement of the building "would prolong the life of the building indefinitely, would materially increase the size of the building, and would be contrary to the purpose and intent of the zoning ordinance." Thereupon the plaintiffs appealed to this Court.

One week after this action was begun, the milk inspector, on re-examination of the plant, informed the plaintiff that the business could be carried on in the present building according to the new milk ordinance, without enlarging it, by extending the existing use throughout the present building, with certain structural changes, and offered to allow such changes; but the plaintiffs refused, because it would eliminate two garages, needed to house automobile trucks, or require them to abandon the process of pumping into a tank, and conveying by truck to a farm for fertilizing and feeding purposes, of waste materials, which is profitable.

Held that the refusal by the Board of Adjustment to grant a permit to the plaintiffs was not an abuse of its discretion; and that therefore its determination should be sustained.

NOTE BY EDITOR: In support of its decision, the Court cites the well-known California case of *Hadacheck v. Los Angeles*, which went to the Supreme Court of the United States (239 U. S. 394). In that case an establishment for the manufacture of brick, existing as a non-conforming use in a residential district, was ordered discontinued, the extraction of the clay from the soil being still allowed. Decisions holding that non-conforming uses may be compelled to remove from the district, not cited in the opinion, are *State ex rel. Dema Realty Co. v. McDonald*, 121 So. 613, 168 La. 171 (in which certiorari to the United States Courts was denied; 50 Supreme Court Reporter, 27) and *Same v. Jacoby*, 123 So. 314, 168 La. 571. See also the California case of *Jones v. City of Los Angeles*, 295 Pac. 14.

Mandamus

NEW JERSEY.—*Adelman v. Williams*, 159 Atl. 148.—Allowance of the writ of mandamus rests in the sound discretion of the Court; and will not issue to compel issuance of a building permit for a warehouse on property classified as residential by a zoning ordinance, notwithstanding the ordinance was passed after filing of the application for the permit.

NEW JERSEY.—*Mannino v. Moffett*, 158 Atl. 434.—The refusal of a rule to show cause why a writ of mandamus should not issue to compel the building inspector of the town of Westfield to issue a permit for an addition to a garage, is not appealable, such action being discretionary with the Court.

Eminent Domain

NEW JERSEY.—*Bentley v. City of Newark*, 158 Atl. 463.—The municipality, taking land for a public use which involves exclusive possession and right of possession, acquires a fee; and its title is not ended by its devoting the land to another use.

NEW JERSEY.—*Carroll v. City of Newark*, 158 Atl. 458.—The quality of the interest obtained by a municipality by condemnation is that which the statute authorizes the municipality to acquire; and the Legislature may validly authorize it to take a fee.

Private Covenants — Outbuilding

NEW JERSEY.—*Bruce v. McClees*, 158 Atl. 849.—A private garage attached to a dwelling house is an "outbuilding" within the meaning of a restrictive covenant in a deed against the erection of an outbuilding within 100 feet of a named street.

Pending Zoning Ordinance

NEW JERSEY.—*State ex rel. Mongiello Bros., Inc., v. Board of Commissioners of Jersey City*, 158 Atl. 325.—The relator has applied for a permit to erect a new ice factory to replace an old one. The only reason given by the city for refusing to issue it is that there is a zoning ordinance pending which would forbid the erection of the new building. This ordinance was introduced many months ago, and there is nothing to show that it will ever be passed. *Held* that this proposed ordinance is no ground for the refusal of the permit.

Injunction

NEW JERSEY.—*Srager v. Mintz*, 158 Atl. 471.—The zoning ordinance of the city of Plainfield prohibits slaughterhouses in any part of the city. The respondent Mintz obtained a permit to alter a garage, and used the building for a poultry slaughterhouse. The appellants seek to enjoin the use, not as a common law nuisance, but as a violation of a city ordinance. *Held* that a court of equity will not enforce a municipal ordinance by injunction unless the act sought to be restrained is a common law nuisance.

NOTE BY EDITOR: In *New Jersey Municipalities* for April, 1932, Spaulding Frazer, in "Legal Notes and Comments," criticizes this decision, stating that in his opinion an earlier case, reaching a different conclusion, should have been followed.

Boards of Appeal—Review

NEW YORK.—*Matter of Dunne*, Appellate Division, reported in *New York Law Journal*, March 29, 1932.—The Supreme Court may not reverse a determination of the Board of Standards and Appeals which is not a clear abuse of discretion. The fact that new evidence is not taken by the Court does not change that rule. The right of the Court in its discretion to receive new evidence should be exercised cautiously, only where it appears to be probable that the new evidence, if so received, will show that the ruling complained of is wrong.

Highways—Easement of Access

NORTH CAROLINA.—*Davis v. Alexander*, 162 S. E. 372.—The owner of a residence facing an abandoned portion of a relocated road has an easement of ingress and egress, enforceable by injunction against the owner of adjoining land.

Zoning in Denver

The Board of Adjustment of Denver has issued in typewritten form its report for the year ending February 10, 1932.

ZONING DECISIONS, 1931

as reported in The American City are indexed in the 1932 Municipal Index.

The TRAFILATOR System

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THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Abandoned Streets

Strip of street rendered insufficient for public use held to revert to adjoining landowner (Oklahoma Supreme Court: *City of Tulsa v. Horwitz*, 3 Pac. 2d 841).

Abolishing Offices

Chief of police separated from office before it was abolished held without standing to attack abolishment (New Jersey Supreme Court: *Clossey v. Civil Service Commission*, 157 Atl. 253).

Accidents

City immune from liability for negligent operation of fire department vehicle colliding with private automobile (Colorado Supreme Court: *Moses v. City and County of Denver*, 5 Pac. 2d, 581).

Defect in statutory notice of claim against city for injuries held subject to waiver (Florida Supreme Court: *Kibbe v. City of Miami*, 138 So. 371).

City held liable for negligence of policeman in running motorcycle against pedestrian on sidewalk (Florida Supreme Court: *City of West Palm Beach v. Grimmett*, 137 So. 385).

City held liable for fall of pedestrian on icy sidewalk, ice having formed as a result of flooding adjacent playground and having remained for many days (Illinois Supreme Court: *Graham v. City of Chicago*, 178 N. E. 911).

City held not liable for death caused by negligent driving of police department automobile (Indiana Appellate Court: *Smith v. City of Gary*, 178 N. E. 572).

City, county and county officials held not liable for accidental death of county prisoner through cave-in of ditch in which he was working (Kansas Supreme Court: *Kebert v. Board of County Commissioners of County of Wilson*, 5 Pac. 2d, 1085).

An unverified personal injury claim held insufficient to permit suit (New York Supreme Court, Appellate Division: *Ayers v. City of Buffalo*, 252 N. Y. Supp. 806).

Fatal injury to motorist driving over unguarded approach to bridge held not due to negligence of city (Ohio Court of Appeals: *City of Cincinnati v. Metze*, 178 N. E. 222).

Proof how long sidewalk was in icy condition held essential to city's liability for fall of pedestrian (Pennsylvania Superior Court: *Chase v. City of Erie*, 156 Atl. 630).

Airports

City held empowered to regulate use of municipal airport lying partly beyond city limits (California District Court of Appeal: *Ebrite v. Crawford*, 5 Pac. 2d, 686).

Municipal Liability

City held liable for negligence of playground director, but verdict against city and exonerating him held invalid (New York Supreme Court, Appellate Division: *Agoado v. Cohen*, 254 N. Y. Supp. 134).

Pedestrian shot in heel by special park policeman for violating warning against crossing bridge under repair held without valid damage claim against city (Delaware Superior Court: *Kelley v. Mayor and Council of Wilmington*, 156 Atl. 867).

Improvement Assessments

Donation in excess of potential liability for assessment may be accepted in lieu of assessment (Kentucky Court of Appeals: *Hearne v. City of Catlettsburg*, 40 S. W. 2d, 293).

Obstructing Streams

City held liable for damage to private property caused by obstruction of watercourse used for discharge of sewage (Pennsylvania Superior Court: *Yeager v. City of Pittsburgh*, 157 Atl. 353).

Occupation Licenses

Private delivery truck held not covered by ordinance licensing vehicles operated for "hire or compensation" (Kentucky Court of Appeals: *Kroger Grocery & Baking Co. v. City of Cynthiana*, 42 S. W. 2d, 904).

Office Holding

One who had qualified as school trustee held to automatically vacate that office when he qualified as city councilman (Kentucky Court of Appeals: *Middleton v. Middleton*, 40 S. W. 2d, 311).

Officer's Liability

Bond covering one office held not to cover distinct office held by same incumbent, although holder of first office is ex officio holder of the other (California District Court of Appeal: *City of San Bruno v. National Surety Co.*, 5 Pac. 2d, 951).

City clerk held not liable on bond for false report, or failure to make report, not resulting in loss to city (California District Court of Appeal: *City of San Bruno v. National Surety Co.*, 5 Pac. 2d, 951).

Scope of city marshal's bond held governed by ordinance or statute under which given, despite wording; but bond to city did not make sureties liable for unlawful arrest (Texas Court of Civil Appeals: *American Indemnity Co. v. Yocham*, 42 S. W. 2d, 817).

City controller and surety held liable for his failure to make deduction in disbursing money under construction contract (Washington Supreme Court: *City of Tacoma v. Peterson*, 5 Pac. 2d, 1022).

Official Eligibility

Prohibition against holding more than one office at same time "in this state" applies to state, and not to municipal offices (Tennessee Supreme Court: *Boswell v. Powell*, 43 S. W. 2d, 495).

Official Oaths

Office held not forfeited for failure to file official oath (Washington Supreme Court: *Bell v. Town of Mabton*, 5 Pac. 2d, 514).

Ordinance Enactment

Ordinance held not vitiated by using word "motion" instead of "ordained" (Alabama Court of Appeals: *Jackson v. City of Prichard*, 137 So. 469).

Parking

Ordinance prohibiting parking for more than six hours held not to permit invasion of abutter's rights by parking for six hours or less (New York Supreme Court, Appellate Division: *Decker v. Goddard*, 251 N. Y. Supp. 440).

Pavement Guaranties

Paving contractor's bond guaranteeing work held voided through city's interfering in work (New York Supreme Court, Appellate Division: *City of Syracuse v. Dale Engineering Co.*, 253 N. Y. Supp. 444).

Paving Assessments

Street paving assessment vitiated by omission of 250 feet of paving from improvement originally ordered (Colorado Supreme Court: *Miller v. City and County of Denver*, 5 Pac. 2d, 875).

Statute held not to authorize special levy for cost of paving in front of school district property (New Mexico Supreme Court: *Oliver v. Board of Trustees of Town of Alamogorda*, 1 Pac. 2d, 116).

Paving assessments held vitiated by omission of one block from the middle of a continguous street improvement originally planned (Ohio Court of Appeals, Muskingum County: *Johnson v. Village of New Concord*, 176 N. E. 689).

Abutter held not entitled to attack paving assessment in suit to enforce certificate on ground that property did not abut on improvement, where that would contradict council record and his own admission (West Virginia Supreme Court of Appeals: *Ohio Savings Bank & Trust Co. v. Ballard*, 161 S. E. 445).

Paving Bids

Invitation for paving bids held not invalid because right reserved to award contract for one or more of four streets nor because authorizing bids on one or both of two kinds of pavement (Massachusetts Supreme Judicial Court: *Devir v. Hastings*, 178 N. E. 617).

Pensions

Fireman's period of service, as pension basis, held limited to service in paid fire department, not including previous service (New Jersey Supreme Court: *Kotze v. Montclair Police and Firemen's Pension Commission*, 157 Atl. 150).

Announcing the NEW

INTERNATIONALS

Models A-7 and A-8

POWERFUL • FAST • BIG • MODERN

TWO new International Trucks—Heavy-Duty Models A-7 and A-8—are now available. They are designed and built to meet the present-day demands for moving heavy loads with speed and unfailing dependability. They are unusually easy to handle.

These two new Internationals are built in 160, 180, 200, and 225-inch wheelbases.

The 6-cylinder engines of both of these new models are valve-in-head type. They have removable cylinders—an International feature that makes for remarkably low maintenance cost! Special three-point mounting cushions the power plant against road shocks, and permits its removal as a unit.

Five speeds forward and two reverse provide high speed for hard roads and tremendous pulling power for climbing hills and negotiating sand and soft roads.

There are four rear springs instead of the conventional two. These are of dual, semi-elliptic type, one mounted above and one below the rear axle on each side—assuring improved cushioning, and greater strength to absorb the enormous torque and driving stresses of the rear axle.

See the Models A-7 and A-8 now. Have the nearest of 183 Company-owned branches in the United States and Canada, or an International dealer, arrange a demonstration. In no other way can you get a true picture of the new truck-value these two new trucks represent. Write us for catalog.

A-7 and A-8 Features:

Rated Capacity: (Both A-7 and A-8) 5 tons. Maximum Capacity, including cab, body, equipment, and pay load: 24,000 pounds.

Wheelbases: 160, 180, 200, and 225 inches.

Engine: Both models, 6-cylinder, valve-in-head type. Model A-7, 4½-inch bore x 5½-inch stroke. Model A-8, 5-inch bore x 5½-inch stroke. Engine features include removable cylinders, full pressure lubrication, oil filter, oil-type air cleaner, fuel pump, and downdraft carburetion.

Clutch: 15-inch, single-plate type.

Transmission: 5 speeds forward, 2 reverse.

Final Drive: Full-floating, double-reduction gear type.

Steering Gear: Irreversible cam-and-lever type.

Springs: Semi-elliptic front and dual semi-elliptic rear.

Brakes: 4-wheel, mechanical, internal-expanding type service brakes with vacuum booster. Ventilated disc type emergency brake on propeller shaft.

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Neighborhood Planning

Planning for Residential Districts.—Reports of the Committee on City Planning and Zoning, Subdivision Layout, Utilities for Houses, and Landscape Planning and Planting. The President's Conference on Home Building and Home Ownership, Washington, D. C. 1932. 227 *pp., illustrated.* $1.15.

It is especially significant of growing realization of the importance of city and neighborhood planning that the first volume of the final reports of the President's Conference on Home Building and Home Ownership, held in Washington last December, is devoted to the surrounding of the home, rather than to the home itself. Ten additional volumes, presenting the reports of the twenty-seven other committees, are now in preparation. "Planning for Residential Districts" is the first to appear "because the Conference revealed that good housing is dependent first of all on good surroundings. A dwelling may be of good design and well constructed, but if it is in a slum or a factory district, if its lacks privacy, quiet, or sunlight, running water or sewers, if through-traffic endangers the lives of its children, if ugliness is all about it, if no parks or playgrounds are within walking distance, it is not good housing." These faults may be overcome by proper planning, and the volume under consideration offers a program based on the recommendations of the specialists who made up the committees.

Police Costs

The New Jersey Commission to Investigate County and Municipal Taxation and Expenditures has issued its Report No. 7, on "Local Police Protection Services and Costs." See p. 105. (Apply to the Commission, Broad St. Bank Bldg., Trenton, N. J.)

Fire Protection

Several committee reports of the National Fire Protection Association, prepared for presentation at the annual meeting, May 10-12, are available in advance for examination and comment. Of special interest to municipal officials are those of the committees on Garages (see p. 17), Public Water Supplies for Private Fire Protection (report has special reference to water charges), and the Forest Committee, the report of which deals with the forest and brush fire problems of communities, and the proper kind of equipment. 11, 11 and 12 pp., respectively. (Apply to the Association, 60 Batterymarch St., Boston, Mass.)

Concrete Pavements

Bulletin No. 25 of the American Road Builders' Association is "Recent Practical Developments in the Design and Construction of Reinforced Concrete Pavements and Bases." As a basis of indicating current design practice, a complete survey of state highway practice has been made, present practices and trends analyzed, and certain general conclusions drawn. 47 pp. (Apply to the Association, National Press Bldg., Washington, D. C.)

Unemployment Relief

The Survey for April 15 contains a 6-page article entitled "How the Cities Stand," giving brief reports from prominent social agency executives on the unemployment situation in 37 of the largest American cities. The burden of the messages is summed up in the subtitle: "Relief: Going Up; Work: Static; Funds: Going Down." *The Survey* is 30c a copy. (Apply to *The Survey*, 112 E. 19th St., New York.)

Plumbing Code

The Wisconsin State Board of Health has issued in a convenient pocket-sized volume, the 1932 edition of the revised "Wisconsin State Plumbing Code," the rules and regulations of which govern the construction, installation and inspection of plumbing and drainage, the licensing of plumbers and the supervision of apprentices. 266 pp. 50c to those outside the state. (Apply to the State Board of Health, Capitol Bldg., Madison, Wis.)

Financial Statistics

The Bureau of the Census of the U. S. Department of Commerce has published in bound-volume form "Financial Statistics of Cities Having a Population of Over 30,000: 1929." The purpose of the report is "to provide information in regard to the financial administration of the cities, in such form as to be comparable, with the hope that it may be of assistance to the officials who are charged with responsibilities incident to the administration of local government and the betterment of the local communities." 515 pp. $1.25. (Apply to the Supt. of Documents, Washington, D. C.)

Sewage Disposal

"Financing Sewage Disposal," a paper by Howard R. Green, President, H. R. Green Co., Cedar Rapids, Iowa, presented at the 1931 conference on sewage treatment held at the Iowa State College under the auspices of the Engineering Extension Service, has been published in pamphlet form, with the discussion which followed the paper. Costs of plants and methods of financing are taken up. 15 pp. (Apply to the Engineering Extension Service, Iowa State College, Ames, Iowa.)

Traffic

The "Proceedings of the Second Annual Meeting of the Institute of Traffic Engineers," held at Chicago, Ill., October 15, 1931, are available in a mimeographed volume. Committee reports and eight members' papers are included. 124 pp. $2.50. (Apply to the Institute, 175 Fifth Ave., New York.)

Shade Trees

Thirty-three papers relating to the care of shade trees are reprinted in the "Proceedings of the Seventh National Shade Tree Conference," which report the 1931 meeting, held at Yonkers, N. Y. 148 pp. Single copies, 70c each, postage paid; lots of 10 or more copies, 60c each plus postage. (Apply to Rush P. Marshall, Secretary-Treasurer, National Shade Tree Conference, Marsh Hall, Yale University, New Haven, Conn.)

Municipal Engineers

The "Official Proceedings of the Thirty-Seventh Annual Convention of the American Society of Municipal Engineers," held at Pittsburgh, Pa., in October, 1931, are published in an 855-page volume. Separate chapters are devoted to City Planning; Airports and Landing Fields; Street and Traffic Lighting; Traffic Control; Water Works; Refuse Disposal and Street Cleaning; Sewerage and Sanitation; Municipal Legislation and Finance; Public Utilities; Street Paving, Design, Construction and Maintenance; Municipal Unemployment Work Relief Programs; Highway Sidewalks. There is no index. $7.50. (Apply to the Society, 4359 Lindell Blvd., St. Louis, Mo.)

Housing

"Homes Should Be Near Workshops" is the title of a double number of *Housing and Building*, the review of the International Housing Association (No. 1/2 for 1932), published in English, French and German. The number, compiled by Dr. H. Kampffmeyer, Secretary of the Association, is made up of three illustrated sections: (1) The Garden City Movement; (2) Town-Planning in Soviet Russia; (3) The Colonisation of the Unemployed. The section on Russia is believed to contain more information on the subject of town planning in the U.S.S.R. than has hitherto appeared in languages other than Russian. 70 pp. 6.80 marks. (Apply to the Association, Frankfort/M, Hansa-Allee 27, Germany.)

Landing Fields

"Establishment and Operation of Department of Commerce Intermediate Landing Fields," Aeronautics Bulletin No. 11, is published under date of January 1, 1932, and is available from the Government Printing Office, Washington, D. C., on request.

Tax Rates

The Municipal Administration Service's tenth annual compilation and comparison of municipal tax burdens, "Comparative Tax Rates of 293 Cities, 1931," by C. E. Rightor, Detroit Bureau of Governmental Research, appears as Statistical Series Publication No. 6. 16 pp. 20c. (Apply to the Municipal Administration Service, 309 E. 34th St., New York.)

Regional Planning

The Regional Planning Federation of the Philadelphia Tri-State District, which embraces Wilmington, Del., Camden and Trenton, N. J., and Philadelphia, has prepared a handsomely illustrated brochure, "Regional Planning—The Region—Past, Present and Future," summarizing its policies, procedure and findings. 54 quarto pp. (Apply to the Federation, Philadelphia, Pa.)

Municipal Corporations

"The Status of the Municipal Corporation in American Law," its history and development, are discussed by Charles W. Tooke, Professor of Law, New York University, in an article which has been reprinted from the *Minnesota Law Review*. 18 pp. (Apply to Professor Tooke, New York University, New York.)

Masonry Decay

The American Society for Testing Materials has reprinted from the 1931 Proceedings of the Society the "Symposium on Weathering Characteristics on Masonry Materials," consisting of the papers and discussion which made up the meeting on that subject at the last annual meeting of the Society. An annotated bibliography is included. 128 pp. 60c. (Apply to the Society, 1315 Spruce St., Philadelphia, Pa.)

Parks

"New Jersey State Parks, 1932" is an inviting illustrated booklet prepared by State Forester C. P. Wilber, Chief of the Division of Forests and Parks, to meet many requests for information about the parks. Air views on which park boundaries, highways and nearby towns and cities are indicated are used instead of diagrammatic maps. 55 pp. (Apply to the Division of Forests and Parks, State House Annex, Trenton, N. J.)

Local Officials

The League of Wisconsin Municipalities has prepared "Local Officials in Wisconsin—A Summary of the Principal Officials by Type of Municipality." This mimeographed list tabulates the number of the various types of officials, including only those of separate and distinct municipalities. 6 pp. 25c. (Apply to the League, 114 N. Carroll St., Madison, Wis.)

Diphtheria Prevention

"Saving Children's Lives—Diphtheria Prevention in the City of New York," an illustrated pamphlet of 52 pages, presents the proceedings of a luncheon given by Thomas W. Lamont to the Editorial Consulting Board of the Diphtheria Prevention Commission of the City of New York; including a proposal for a permanent city health commission, together with a special account of the methods proved successful in the New York campaign against diphtheria, carried on for the three years ending Nov., 1931. The addresses given at the luncheon, by Mr. Lamont, Health Commissioner Shirley W. Wynne, Homer Folks, Dr. Linsly R. Williams, John H. Finley, Albert G. Milbank and Dr. James Alexander Miller, tell of the leadership of the Commission through the generous help of the Milbank Memorial Fund; the prevention of other diseases, indicated as possible by the example of this campaign; the financial gain of this movement; the necessary cooperation of physicians; and raising the expectancy of life. The story of the campaign is given by Edward Fisher Brown, Director of the Commission. (Apply to the Commission, Department of Health, New York.)

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Municipal Economies

In "How American Cities Are Retrenching in Time of Depression," Harry H. Freeman, of the Buffalo Municipal Research Bureau, presents a brief summary of the principal economies as reported by 25 of the country's largest cities. The 15-page pamphlet has been published as a supplement to the *National Municipal Review* for April. Ten of the cities covered were visited by members of the Bureau's staff and intensively studied. Further information was gained from questionnaire replies collected by J. M. Leonard of the Detroit Bureau of Governmental Research. 25c. (Apply to the National Municipal League, 309 E. 34th St., New York.)

Rural Sanitation

To supply rural home owners with accurate information, the New York State Department of Health has prepared a bulletin on "Rural Water Supply and Sewage Disposal Systems." A number of diagrams illustrating different types of construction are included. 49 pp. (Apply to the Department, Albany, N. Y.)

State Aids

The great variety of sources from which every city and village in Wisconsin receives certain income indirectly from the state is shown by the League of Wisconsin Municipalities in a mimeographed report on "Funds Received by Wisconsin Cities and Villages from State Aids and State Taxes." 11 pp. 50c. (Apply to the League, 114 N. Carroll St., Madison, Wis.)

Homeless Men

A report on "Community Planning for Homeless Men and Boys," made by Robert S. Wilson, Special Research Assistant, for the Family Welfare Association of America, records the experience of sixteen cities in the winter of 1930-1931, upon which are based recommendations "which contain those phases of city planning for homeless men which some cities have found useful through the testing of experience and whose absence in other cities seems to have proved a definite loss." 144 pp. 50c; special price for quantities. (Apply to the Assn., 130 E. 22d St., New York.)

Tanks

The 1931 edition of the "Regulations of the National Board of Fire Underwriters for the Construction and Installation of Gravity and Pressure Tanks, Towers, etc." is a revision of the 1926 handbook, incorporating various amendments made since that time. 128 pp. (Apply to the National Board of Fire Underwriters, 85 John St., New York.)

Smoke Prevention

Circular No. 24 of the Ohio State University Engineering Experiment Station is a discussion of "Smoke and Its Prevention," by H. M. Faust, Research Engineer of the Station. It is an illustrated pamphlet issued in cooperation with the Ohio Department of Industrial Relations and the Ohio Coal Investigation Committee. 15 pp. Free. (Apply to the Engineering Experiment Station, Ohio State University, Columbus, Ohio.)

Loose Milk

"Is Loose Milk a Health Hazard?" is the title of the effectively illustrated report of the commission appointed by Dr. Shirley W. Wynne, Commissioner of Health of the City of New York, to study the public health aspects of the sale of loose milk in the city and to make recommendations. The recommendation is made that the sale of loose or dipped milk not consumed on the premises should be prohibited, and the supporting data occupy 284 pages. (Apply to the Milk Commission, Dept. of Health, New York City.)

Nursery Education

"Nursery Education—A Survey of Day Nurseries, Nursery School and Private Kindergartens in the United States," published by the Century Co., is the report of the Committee on the Infant and Preschool Child of the White House Conference on Child Health and Protection. It is based on an extensive first-hand investigation of 1,275 institutions in which a total of 49,358 children were enrolled, and a study of 2,757 families and over 4,000 children. General findings and specific recommendations are presented. 187 pp. $2.00 from THE AMERICAN CITY.

Construction

The first publication of the National Conference on Construction, an organization comprising leaders in all branches of the construction industry, is "Local Construction Inventories." This includes a report by the Committee on Business Reports, Statistics and Trade Information, and a manual of instructions as to the methods of conducting an occupancy-vacancy survey. The Committee believes that such surveys should be made regularly—annually if possible. The manual, prepared by the Division of Building and Housing of the U. S. Department of Commerce, includes chapters on planning, directing and organizing a survey, on determining what information is to be gathered, on the actual process of gathering the data in the field, and on methods of compilation and tabulation of the data. 57 pp., mimeographed. (Apply to the Conference, 1615 H St., N.W., Washington, D. C.)

Electric Rates

The lighting and power rates, plant values, revenues, expenses, etc., of 100 municipally owned electric plants in 30 different states have been compiled by Burns & McDonnell Engineering Co. in an attractive booklet of 56 pages. The plants covered vary greatly in size, and include various methods of generation. $1.00; 10-20-30% discounts for 5, 10 and 15 copies respectively. (Apply to Burns & McDonnell, 406 Interstate Bldg., Kansas City, Mo.)

Fiscal Statistics

The Oklahoma Municipal League has issued a 5-page lithographed report on "Financial Statistics of Oklahoma Cities and Towns—Fiscal Year 1931-32," based upon municipal budgets, tabulating the budget allowances for various city departments and offices. (Apply to the League, Norman, Okla.)

Income Taxes

The increasing interest in income taxes as a means of lightening the real estate tax load is reflected in a preliminary report to state leagues of municipalities, by Paul V. Betters, Executive Secretary of the American Municipal Association, entitled "State-Administered Locally-Shared Income Taxes," and dated March 15, 1932. It summarizes in text and tables the income tax provisions in various states, including the five which share this tax with localities. There is also a bibliography. 12 pp. (Apply to the author, 58th and Drexel Ave., Chicago, Ill.)

Construction Stabilization

Fay, Spofford & Thorndike, consulting engineers, 44 School St., Boston, Mass., have made a study of the trend in construction volume and costs, the results of which are available in 11-page typewritten form under the title, "Stabilization of the Construction Industry and Trend of Construction Costs," to municipal officials on request. A portion of this appeared in THE AMERICAN CITY for April at p. 58.

Child Welfare

The White House Conference on Child Health and Protection has issued a "working pamphlet" based on the findings of the Conference, entitled "Suggestions for Three Community Studies (Including Study Questions and Work Sheets)." The suggested fields of study are Public Health Service and Administration; Education and Training; and The Handicapped Child. The first section gives reasons why studies are needed, and includes selected bibliographies; the second section provides questions by which any community can evaluate its own resources and needs in the three fields referred to. 42 pp. Single copies free; special prices for quantities. (Apply to The Office of Public Relations, Room 1402, 450 Seventh Ave., New York.)

School Centers

The development of the community phase of New York City's school centers is described in "New York School Centers and Their Community Policy" as a "significant extension of educational technique." The study, by Clarence Arthur Perry and Marguerita P. Williams of the Department of Recreation of the Russell Sage Foundation, is presented in three parts: (1) the present school-center policy; (2) the historical antecedents of the community polity; and (3) the results which have followed its inauguration. 78 pp. 50c. (Apply to the Russell Sage Foundation, 130 E. 22d St., New York.)

Automobile Accidents

An analysis of the extent and causes of automobile accidents in the United Saates in 1931 has been issued by The Travelers Insurance Co., of Hartford, Conn., under the title "Tremendous Trifles"—further explained by the subtitle "Minor Decisions of Major Importance." Data from the states equipped to furnish this material have been compiled, and the totals proportionately increased to approximate a nation-wide picture. Stress is placed on the vital necessity of caution on the part of both drivers and pedestrians. Many charts and illustrations help to emphasize important points. 56 pp. (Apply to G. D. Newton, News Bureau, The Travelers Insurance Co., Hartford, Conn.)

Taxation

Report No. 6, entitled "The Revenue System of New Jersey," has been issued by the Commission on County and Municipal Taxation and Expenditures of that state. Besides analyzing and describing the existing revenue system, the report proposes a revised revenue system for state and local purposes, as well as recommendations for the control of expenditures, administrative tax reforms, and a wider spread of the tax burden. 287 pp. (Apply to the Commission, Broad Street Bank Bldg., Trenton, N. J.)

Municipal Music

The city of Baltimore has published a 35-page illustrated pamphlet entitled "Baltimore—'Cradle of Municipal Music'" prepared by Kenneth S. Clark, author of "Municipal Aid to Music in America," and "Music in Industry," and giving a historical sketch of this city's musical development. Frederick R. Huber has been the Municipal Director of Music in Baltimore since 1918. The movement has been fostered by the administrations of Mayors Preston, Broening and Jackson, and as early as 1915 the city's band concerts were stimulating community singing. The Baltimore Symphony Orchestra made its debut in 1916. The history of the Orchestra since that time is of exceeding interest. The Troubadour Bands (the Municipal Band and the City Colored Band) take the music to the people; the Park Band plays in the larger parks. There are other developments and possibilities that prove that Baltimore is "musically alive." (Apply to the Department of Music, 17 E. Mt. Vernon Pl., Baltimore, Md.)

Prevention of Blindness

The arresting cover, showing the eager, bright-eyed singing child with the opening notes of "O say, can you SEE?", makes one quick to examine the pamphlet "How Eyes Are Being Saved," which is the 1931 report of the National Society for the Prevention of Blindness, Inc., 450 Seventh Ave., New York. The ways in which progress is being made in eyesight conservation are outlined. These include not only work for babies, pre-school children and school children, but also eye protection in industry. 16 pp. Illustrated. (Apply to the Society.)

Luxury Taxes

Special Report No. 4 of the New York State Tax Commission, entitled "Luxury Taxation and Its Place in a System of Public Revenues," has recently appeared. It is by Dr. Ralph Burnett Tower, research investigator selected by Cornell University to make the study. It contains a general discussion of the nature, history and theory of modern luxury and nuisance taxes, including taxes on tobacco, admissions, soft drinks, malt, etc. A final chapter deals with luxury taxation in New York State. A bibliography is included. 235 pp. (Apply to State Tax Commission, Albany, N. Y.)

Other Reports Received

HAMILTON, ONT.—Annual Report, Chamber of Commerce, year ending March 31, 1932. 31 pp.

HAWAII, TERRITORY OF.—Annual Report, Superintendent of Public Works, year ending June 30, 1931. 99 pp.

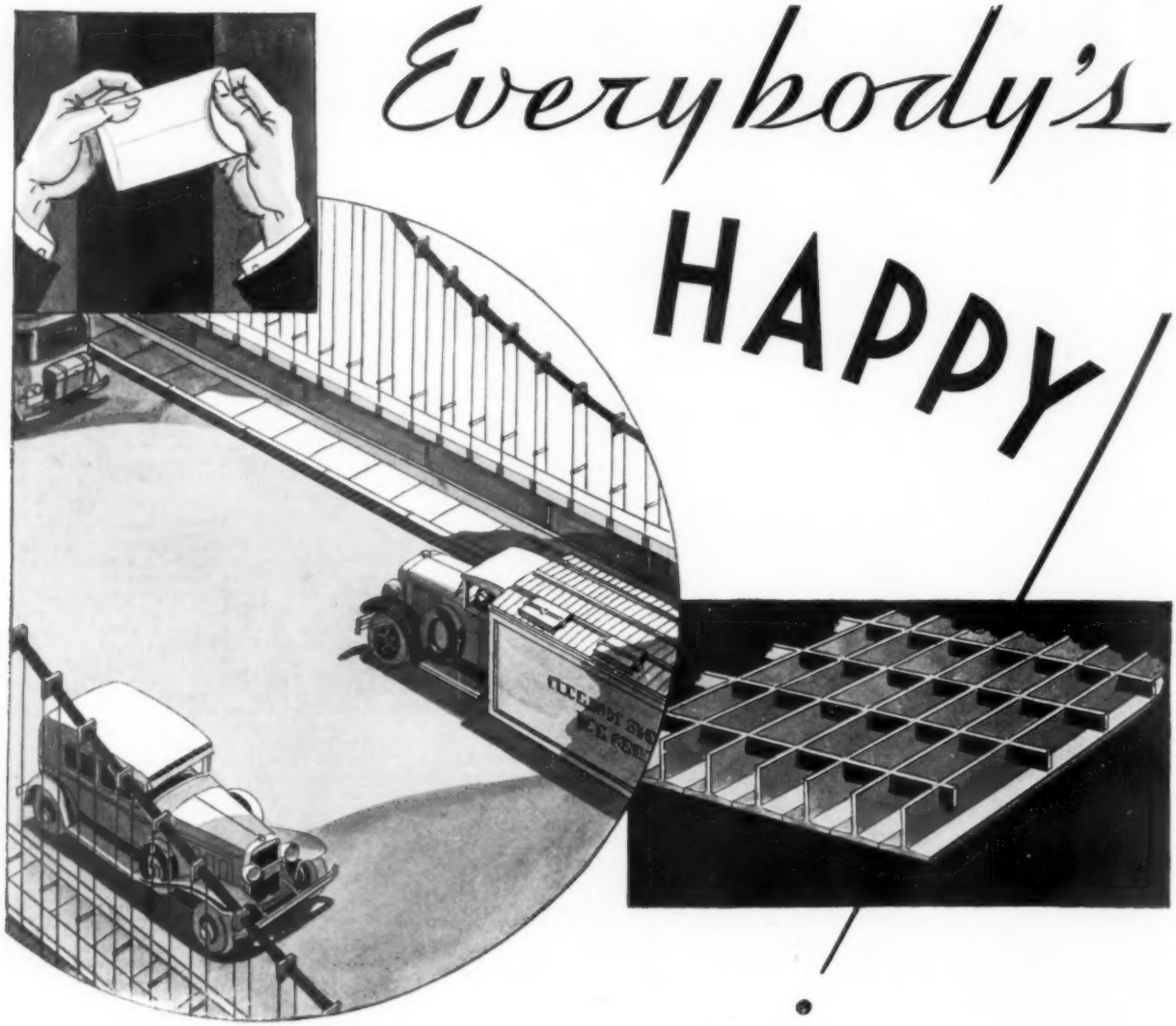
LOWELL, MASS.—First Annual Report, Finance Commission, January, 1932. 47 pp.

MILWAUKEE, WIS.—Annual Report, Common Council, 1931. 180 pp.

NEW JERSEY.—Annual Report, State Regional Planning Commission, February 8, 1932. 16 pp.

OAK PARK, ILL.—Annual Report, Department of Public Works, 1931. 83 pp., mimeographed.

OMAHA, NEBR.—Annual Report, Metropolitan Utilities District, 1931. 15 pp.



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CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

MAY 2-6.—MEMPHIS, TENN. (1,500)
American Water Works Association. Annual convention. Secretary, Beekman C. Little, 29 West 39th Street, New York.

MAY 9-12.—ATLANTIC CITY, N. J.
National Fire Protection Association. Annual meeting. Managing Director, Franklin H. Wentworth, 60 Batterymarch Street, Boston, Mass.

MAY 11-12.—GARY, IND. (200)
Indiana Association of Chiefs of Police. Annual meeting. Secretary-Treasurer, A. G. Eversole, 1123 Main Street, Lafayette, Ind.

MAY 12-14.—WENATCHEE, WASH. (115)
American Water Works Association—Pacific Northwest Section. Annual meeting. Secretary, Ernest C. Willard, 720 Corbett Building, Portland, Ore.

MAY 12-14.—PHILADELPHIA, PA. (500)
National Probation Association. Annual convention. .General Secretary, Charles L. Chute, 450 Seventh Avenue, New York.

MAY 13-15.—ATLANTIC CITY, N. J. (150)
Association of Community Chests and Councils. Annual meeting. Executive Director, Allen T. Burns, 1815 Graybar Building, New York.

MAY 13-14.—ROCKFORD, ILL. (100)
Central States Sewage Works Association. Illinois Association of Sanitary Districts. Annual meetings. Secretary-Treasurer, G. H. Radebaugh, Urbana & Champaign Sanitary District, Urbana, Ill.

MAY 16-18.—PHILADELPHIA, PA.
American Association of Public Welfare Officials. Annual conference to be held with National Conference of Social Work (May 15-21). Director, Frank Bane, 850 East 58th Street, Chicago, Ill.

MAY 16-18.—ATLANTA, GA. (375)
Association of County Commissioners of Georgia. Annual convention. Secretary-Treasurer, Fred Houser, 246 Spring Street, N. W., Atlanta, Ga.

MAY 16-20.—SAN FRANCISCO, CALIF. (3,000)
Chamber of Commerce of the United States of America. Annual meeting. Secretary, D. A. Skinner, 1615 H Street, N. W., Washington, D. C.

MAY 16-17.—SAN FRANCISCO, CALIF.
Western School for Commercial Secretaries. Annual session. Manager, Leonard E. Read, Chamber of Commerce Building, Seattle, Wash.

MAY 23, WEEK OF.—LONDON, ENGLAND.
International Congress of Local Authorities. (Followed by tours in England and Scotland during the next two weeks.) General Secretary, E. Vinck, Rue de la Régence, Brussels, Belgium; General Secretary of the British Organization, G. Montagu Harris, Ministry of Health, Whitehall, London, S. W. I. American inquiries may be addressed to Luther Gulick, Director, Institute of Public Administration, 302 E. 35th St., New York.

MAY 23-24.—JOHNSTOWN, PA. (150)
Pennsylvania Association of Planning Commissioners. Annual convention. Secretary-Treasurer, Leo J. Buettner, City Hall, Johnstown, Pa.

MAY 24-27.—LOS ANGELES, CALIF. (200)
National Association of Public School Business Officials. Annual meeting. Secretary, John S. Mount, Inspector of Accounts, State Department of Public Instruction, Trenton, N. J.

MAY 25-27.—MENASHA, WIS.
League of Wisconsin Municipalities. Annual convention. Secretary, Frederick MacMillin, 114 North Carroll Street, Madison, Wis.

MAY 26-27.—BALTIMORE, MD. (300)
American Forestry Association. Annual meeting. Executive Secretary, Ovid Butler, 1727 K Street, N. W., Washington, D. C.

MAY 26-28.—BOULDER, COLO. (75)
Colorado Municipal League. Annual meeting. Secretary-Treasurer, Don C. Sowers, University of Colorado, Boulder, Colo.

MAY 26.—NEW YORK.
National Board of Fire Underwriters. Annual meeting. General Manager, W. E. Mallalieu, 85 John Street, New York.

MAY 27-28.—WILMINGTON, DEL. (300)
Eastern Association of Fire Chiefs. Annual convention. Secretary, F. E. Soule, Coatesville, Pa.

JUNE 2-3.—WASHINGTON, D. C.
Conference of State and Provincial Health Authorities of North America. Secretary, Dr. A. J. Chesley, State Board of Health, St. Paul, Minn.

JUNE 4-6.—WASHINGTON, D. C.
Conference of State and Territorial Health Officers with the United States Public Health Service. Address: Surgeon General, Treasury Department, Washington, D. C.

JUNE 3-4.—CHAMBERSBURG, PA. (50)
Pennsylvania Commercial Secretaries' Association. Annual meeting. Secretary-Treasurer, John G. Eppinger, Chambersburg, Pa.

JUNE 4.—PARIS, FRANCE. (150)
Association of Garden Cities of France. International Association of Lineal Cities. Director, Georges Benoit-Lévy, "L'Etoile," Pessicart, Nice, France.

JUNE 5-10.—ATLANTIC CITY, N. J. (8,500)
National Electric Light Association. Annual convention. Secretary, A. Jackson Marshall, 420 Lexington Avenue, New York.

JUNE 6-9.—DETROIT, MICH. (1,000)
National Association of Purchasing Agents. Annual convention and Informashow. Secretary-Treasurer, G. A. Renard, 11 Park Place, New York.

JUNE 6-11.—CAMBRIDGE, MASS.
New England Water Works Association. School. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

JUNE 7-9.—BUFFALO, N. Y. (1,000)
Conference of Mayors and Other Municipal Officials of the State of New York. Annual convention. Secretary, William P. Capes, City Hall, Albany, N. Y.

JUNE 7-9.—WASHINGTON, D. C.
International Association of Comptrollers and Accounting Officers. Annual meeting. Secretary, Carl H. Chatters, 850 East 58th Street, Chicago, Ill.

JUNE 8-10.—RED WING, MINN. (500)
League of Minnesota Municipalities. Annual convention. Executive Secretary, Morris B. Lambie, Director of the Extension Division, University of Minnesota, Minneapolis, Minn.

JUNE 13-15.—DALLAS, TEXAS. (300)
League of Texas Municipalities. Annual convention. Executive Secretary, Harvey W. Draper, 319 Kress Building, Houston, Texas.

JUNE 13-17.—LOS ANGELES, CALIF. (400)
School of Citizenship and Public Administration—University of Southern California. Annual short course. Executive Secretary, Walter E. Sykes, University Park, Los Angeles, Calif.

JUNE 14-16.—PORTLAND, ORE. (500)
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Chief of Police, Wilmington, Del.

JUNE 20-24.—CLEVELAND, OHIO. (550)
American Institute of Electrical Engineers. Anunal summer convention. Assistant National Secretary, H. H. Henline, 33 West 39th Street, New York.

JUNE 20-24.—ATLANTIC CITY, N. J.
American Society for Testing Materials. Annual meeting. Secretary-Treasurer, C. L. Warwick, 1315 Spruce Street, Philadelphia, Pa.

JUNE 20-22.—STATE COLLEGE, PA.
Pennsylvania Water Works Operators' Association. Annual convention. Secretary-Treasurer, I. M. Glace, 506 South Office Building, State Capitol, Harrisburg, Pa.

JUNE 21-24.—NEWPORT, R. I. (700)
New England Association of Fire Chiefs. Annual convention. Secretary-Treasurer, John W. O'Hearn, 99 Main Street, Watertown 72, Mass.

JUNE 21-23.—CONNEAUT LAKE, PA.
Pennsylvania State Association of Boroughs. Annual convention. Secretary, J. Herman Knisely, Bureau of Municipalities, Harrisburg, Pa.

JUNE 22-24.—STATE COLLEGE, PA. (140)
Pennsylvania Sewage Works Association.. Annual meeting. Secretary, L. D. Matter, Kirby Health Center, Wilkes-Barre, Pa.

JUNE 27-JULY 1.—LAKE OF BAYS, ONT. (500)
American Society of Mechanical Engineers. Semi-annual meeting. Secretary, C. W. Rice, 29 West 39th Street, New York.

JUNE 27-JULY 2.—ATLANTIC CITY, N. J. (12,000)
National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1201 16th Street, N. W., Washington, D. C.

JULY 6-9.—YELLOWSTONE PARK. (500)
American Society of Civil Engineers. Annual convention. Secretary, George T. Seabury, 33 West 39th Street, New York.

JULY 23-29.—LOS ANGELES, CALIF.
First International Recreation Congress and annual meeting of the National Recreation Association. Administrative Secretary, Thomas E. Rivers, 315 Fourth Avenue, New York.

AUGUST 26-27.—ROCHESTER, N. Y. (200)
National Shade Tree Conference. Annual convention. Secretary-Treasurer, Dr. Rush P. Marshall, Yale University, New Haven, Conn.

SEPTEMBER 13-16.—ST. LOUIS, MO.
International Association of Municipal Electricians. Annual convention. Secretary, W. H. Harth, Columbia, S. C.

SEPTEMBER 18, WEEK OF.—WASHINGTON, D. C.
American Civic Association, Inc. American Institute of Park Executives. Annual meetings. Executive Secretary of the Association, Harlean James, Union Trust Building, Washington, D. C. Executive Secretary of the Institute, William H. Walker, 224 Wakewa Avenue, South Bend, Ind.
The National Conference on Government (listed below) will meet in conjunction with these two organizations.

SEPTEMBER 18, WEEK OF.—WASHINGTON, D. C.
National Conference on Government, a combination of the annual meetings of the following organizations: *National Municipal League,* Secretary, Russell Forbes, 309 East 34th Street, New York; *Proportional Representation League,* Executive Secretary, George H. Hallett, Jr., 311 South Juniper Street, Philadelphia, Pa.; *National Association of Civic Secretaries,* Secretary, H. Marie Dermitt, Hotel William Penn, Pittsburgh, Pa.; *American Legislators' Association,* Director, Henry W. Toll, 850 E. 58th St., Chicago, Ill.

SEPTEMBER 22-23.—ERIE, PA.
American Water Works Association—Central States Section. Annual convention. Secretary, B. J. Lechner, Water Department, Erie, Pa.

SEPTEMBER 27-30.—SPRINGFIELD, MASS.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 29-OCTOBER 1.—PITTSBURGH, PA. (150)
International Association of Public Works Officials. Annual convention. Secretary, A. M. Anderson, 100 North LaSalle Street, Chicago, Ill.

OCTOBER 3-7.—WASHINGTON, D. C. (5,000)
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 10-13.—FORT WORTH, TEXAS. (300)
Southwest Water Works Association. Annual convention. Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 18-21.—SAN DIEGO, CALIF. (800)
International Association of Fire Chiefs. Annual convention. Secretary, James J. Mulcahey, Yonkers, N. Y.

OCTOBER 24-27.—WASHINGTON, D. C.
American Public Health Association. Annual meeting. Acting Executive Secretary, Dr. Kendall Emerson, 450 Seventh Avenue, New York.

OCTOBER 24-26.—CINCINNATI, OHIO. (200)
International City Managers' Association. Annual convention. Executive Secretary, Clarence E. Ridley, 923 East 60th Street, Chicago, Ill.

OCTOBER 31-NOVEMBER 2.—WINSTON-SALEM, N. C.
American Water Works Association—North Carolina Section. Annual meeting. Secretary, Professor H. G. Baity, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 14-18.—WASHINGTON, D. C. (400)
American Association of State Highway Officials. Annual convention. Executive Secretary, W. C. Markham, 1222 National Press Building, Washington, D. C.

NOVEMBER 14-18.—NEW ORLEANS, LA. (200)
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

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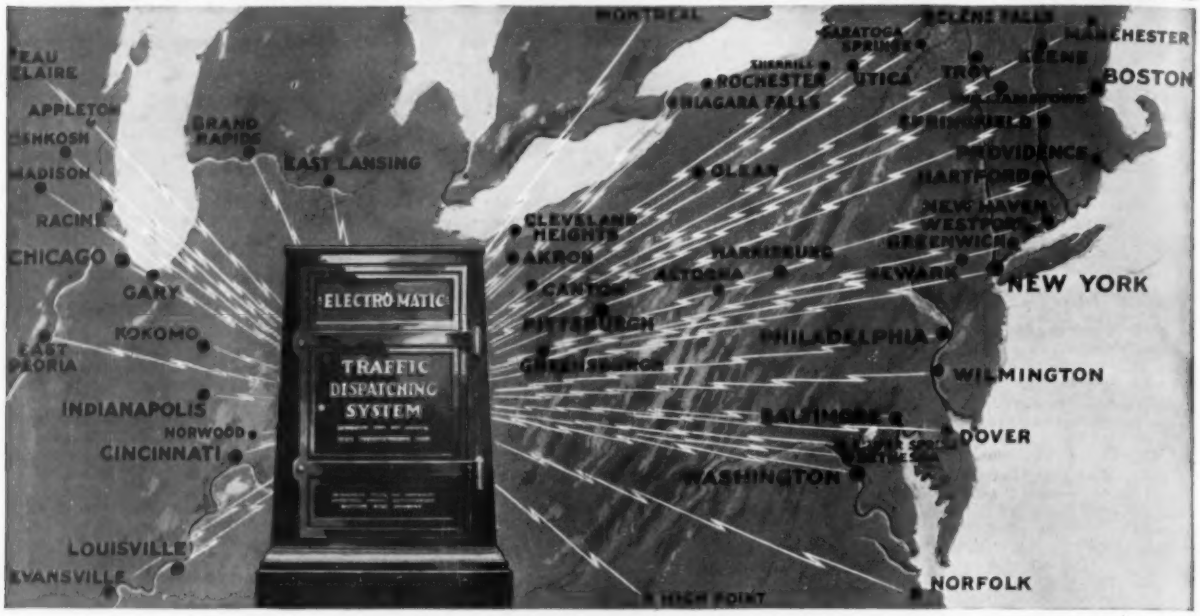

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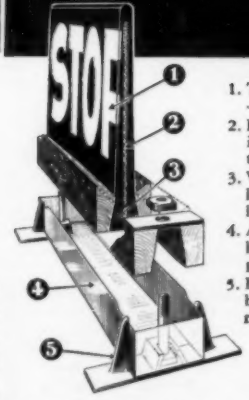
STANDARD SURE-STOP TRAFFIC MARKER



1. Thick letters are inlaid—cannot wear off.
2. Fabric reinforcement insures upright position.
3. Wedge shaped base holds rubber slab firmly in place.
4. Aluminum case embedded permanently in pavement.
5. Brass anchor plate and bolt cannot rust; make refilling easy.

A flexible rubber panel 22 in. long standing upright in pavement, 7 in. high. Letters of Federal Yellow rubber vulcanized into black rubber background. Creosoted wood base with brass anchor plates enclosed in aluminum case.

SIMPLE TO INSTALL.—Cut slot in pavement 4 to 5 in. wide without disturbing paving foundation. Insert marker and pour asphalt or concrete around it. To install refills, simply unscrew nut at ends of base and lift out old marker.

MAKE THIS TEST IN *Your* CITY . . . .

● *"Some time ago we put a few of your Rubber Stop Signs in some of our worst places for accidents. We are so well pleased with the results that we are taking up all other stop signs and installing yours in their places. These Rubber Stop Signs of yours seem to command a driver to stop, and he does it."*

Burt Stuart, *City Engineer, Meridian, Miss.*

● This is the way Sure-Stop Traffic Markers have earned their place on the streets of hundreds of cities and villages. Why not let them show what they can do to prevent accidents in *your* city?

● Order, say, a dozen markers. Place them at some of the most dangerous intersections. The record of accidents before and after installation will amply justify appropriating the modest sum required to install Sure-Stop markers at all points of traffic hazard. Write for literature and prices.

THE GENERAL TIRE & RUBBER CO., Akron, Ohio

Mention THE AMERICAN CITY—it helps.

NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

A Fire Hydrant for Rough Treatment

Difficulties and inconveniences resulting from the breaking of fire hydrants from collisions are minimized in the Kennedy Safetop hydrant, recently developed by The Kennedy Valve Manufacturing Co., Elmira, N. Y. This is so designed that it can be put back into service in short order and at little expense, without shutting down on water pressure and without breaking up the pavement or excavating.

THE SAFETOP HYDRANT

The hydrant is built with a "safety breakable section" a few inches above the ground line. This constitutes the chief special feature. At this section both the standpipe and the stem are divided into two parts; the two portions of the former are threaded at their abutting ends, a correspondingly threaded "breaking ring" holding them rigidly in alignment, while the upper and lower parts of the stem are firmly held in proper position by a coupling that is fastened to each by a large pin. Each of these connecting devices has a groove at the same level as where the upper and lower portions of the standpipe and stem abut, thus forming a breakable section at a specific plane, where rupture is localized in case of a collision from a truck or other motor-car. This section is nevertheless designed to withstand the amount of force that the usual hydrant will meet without breaking.

If a collision occurs with such violence as to cause breakage, the only damage is to the standpipe breaking ring and the stem coupling; these break cleanly at their respective grooves, as demonstrated in many tests under actual operating conditions. The upper portion of the hydrant, with its bronze nozzles, remains intact, merely being dislodged.

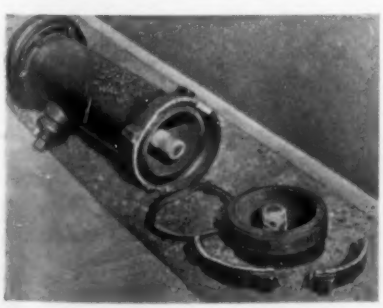
The ring and coupling are thus the only parts needing replacement, requiring for tools only a light sledge-hammer, a large screw driver and a wrench. No excavation is necessary, and the water need not be shut off in the main, as the pressure keeps the inlet valve tightly closed, preventing flooding. The hydrant can be put back into service in less than a half-hour, at a total cost of under $10 for material and labor.

The Kennedy Safetop fire hydrant also provides special safeguards for the public, as nearby property owners are protected against flooding of cellars and deprivation of water service, and fire protection is not diminished by shutting off the water supply.

As an added feature, the nozzles can be made to face in any desired direction by a simple rotative adjustment, the standpipe breaking ring being loosened a quarter- or half-turn to permit this.

The compression type of inlet valve, the simple straight-line operating mechanism, the automatic and positive double drain valve and other features of the Safetop hydrant are the same as in the Kennedy Newtype fire hydrant. The design is further improved by a larger standpipe, easier curves in elbow and nozzle entrances to minimize friction losses, and special long-wearing valve and gasket materials.

DURING COLLISION



AFTER COLLISION

Baltimore to Build Water Tank of Prize Design

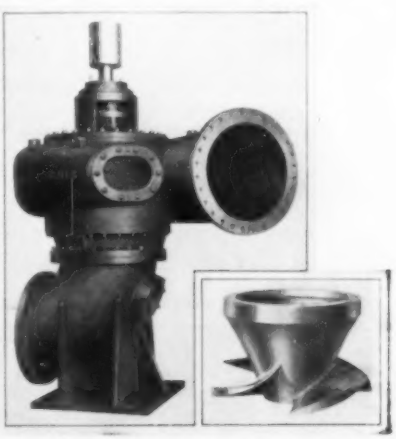
The city of Baltimore, Md., received bids on March 1 for a 300,000-gallon elevated tank to be built according to the design which was awarded first prize in the International Tank Competition which was sponsored by the Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago, Ill. This company has secured the award and is building the structure.

The Baltimore tank will be erected in Towson, Md., and will be 72 feet to the bottom. The bottom will be of the radial-cone type. The design, according to a report of the Baltimore *Sun*, has been approved by the residents of Towson, the Baltimore County Commissioners, the Metropolitan Commission of Baltimore, and the city.

DESIGN OF THE NEW BALTIMORE ELEVATED WATER TANK

A New Sewage and Storm Water Pump

A new type of pump for handling sewage and storm water or for general drainage or condenser services has been announced by Morris Machine Works, Baldwinsville, N. Y. A feature of special interest in this pump is the propeller, which is of the screw type with vanes



ONE OF THE NEW MORRIS SEWAGE PUMPS AND A DETAIL OF THE SCREW-TYPE PROPELLER

Boosting Pride and Cutting Taxes

Public property that is enclosed with Continental Chain-Link Fence is shielded against unwarranted intrusion and less money is required for upkeep. The public also is impressed by the neat, well-kept and orderly appearance of the property. It immediately becomes a source of pride to all community-minded citizens.

Continental Chain-Link Fence is truly *a superior fence.* Every particle of wire used in its manufacture is made exclusively from *Special Analysis, "Copper-bearing"* steel-galvanized *after weaving* by the "hot dip" process. It is made to last a lifetime and is installed complete by trained erection crews. The Continental distributor *in your vicinity* will gladly quote *exact costs.* Write now for his name and further interesting details.

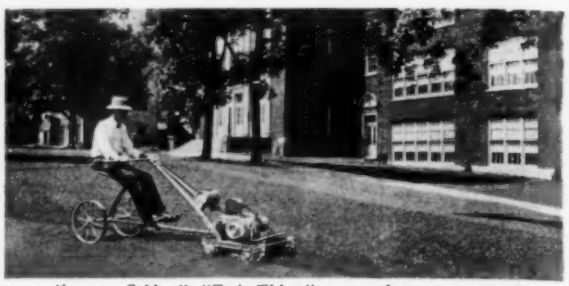
CONTINENTAL STEEL CORP.
KOKOMO, INDIANA

Distributors in all Principal Cities

Manufacturers of: Chain-Link, Farm, Poultry and Lawn Fence and Gates; Billets, Rods, Wire, Nails and Barbed Wire; Black, Galvanized and Roofing Sheets

CONTINENTAL
TRADE MARK
chain-link
FENCE
Offers Lowest Cost Per Year Of Service

SINCE 1867
COLDWELL



Above: Coldwell "Twin-Thirty" motor lawn mower and roller. Mows and rolls simultaneously 6 to 8 acres a day on one gallon of gasoline

Finer Public Lawns at Less Expense

INVESTIGATE the 1932 Coldwell "Twin." Greater power provides larger capacity without additional expense.

Let us demonstrate the ability of a Coldwell Dependable Power lawn mower and roller to develop and maintain your lawns in **Finer Condition** at **Less Expense.**

Full details on request.

COLDWELL LAWN MOWER CO., NEWBURGH, N. Y., U. S. A.
In Canada—Taylor-Forbes Co., Ltd., Guelph

Manufacturers of ***DEPENDABLE*** *Lawn Mowers*—HAND, HORSE, GASOLINE, ELECTRIC

COMBINATION NO. E-125
EverWear Playground and Water Apparatus. The recognized standard of safe and permanent value for the playground and swimming place.

Write for New Catalog

The EverWear Manufacturing Company
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Put some of your unemployed to work on a job of real value to your city!

Do any sections of your city need numbering or renumbering? Now is the time to do the job—when thousands of men are looking for work. Write us today for samples and prices of *PREMAX De Luxe House Numbers,* and also a copy of the Premax Manual "House Numbering Methods" which tells you how to do the job.

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234 TENTH STREET NIAGARA FALLS, NEW YORK

somewhat similar to those of a ship's propeller. This distinctive propeller has two important characteristics. In the first place, the widely spaced open vanes permit passing solids of larger size without danger of clogging. Secondly, the design permits delivering large quantities of water at low heads when operating at comparatively high rotative speeds, so that on low head services the pump is better suited for direct motor drive than are standard centrifugal pumps. A 42-inch pump of this design showed an efficiency of more than 85 per cent on plant test when delivering 45,000 g.p.m. against a total head of 22.5 feet operating at 600 r.p.m.

The casing has a large handhole opening for inspection of the interior and is provided on both sides with renewable discs which are accurately machined for close clearance with the propeller. Special attention is given to the design of the bearings to provide ample support for the shaft and complete counterbalance of end thrust. These pumps are built in sizes 16 inches and larger, and for either horizontal or vertical drive.

Pittsburgh Equitable and Merco Nordstrom Associate Interests

Arrangements have been completed for the Pittsburgh Equitable Meter to acquire all the capital stock of the Merco Nordstrom Valve Co. A study showed that decided advantages could be gained through an association of interests, since Nordstrom lubricated plug valves are sold in the water, gas, oil, and chemical trades to the same customers that are buying Pittsburgh water, oil and gasoline meters and instruments.

This association gives each company additional manufacturing facilities—the meter company securing a Pacific Coast plant to take care of a rapidly expanding business, while the valve company acquires manufacturing facilities for serving Eastern and Midwestern customers.

W. F. Rockwell, President of the Pittsburgh Equitable Meter Co., becomes President of the Merco Nordstrom Valve Co., and several directors of the latter company have been added to the Board of the former. The principal executive offices of both will be in Pittsburgh.

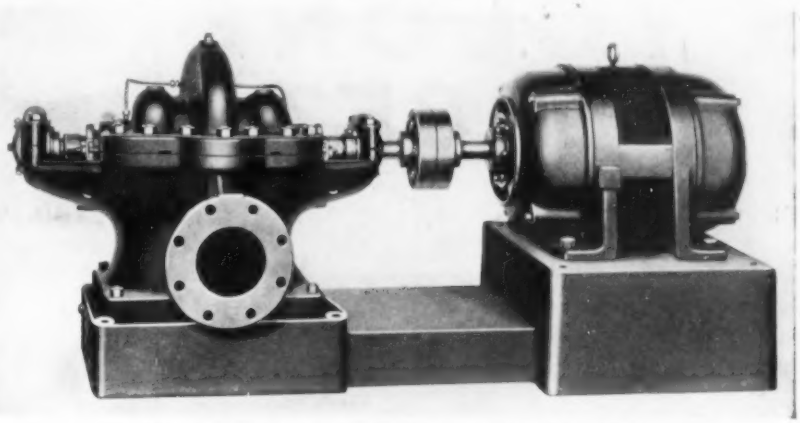
Warehouse stocks for both companies will be carried at Los Angeles, Calif.; Kansas City, Mo.; Chicago, Ill., and Columbia, S. C., and at several other points.

Factory warehouse stocks will be carried at Hopewell, N. J., Pittsburgh, Pa., Tulsa, Okla., and Oakland, Calif.

Sales offices will be maintained at all of the above points and also at Houston and Dallas, Tex.; Denver, Colo.; Salt Lake City, Utah; Columbus, Ohio; Philadelphia, Pa., and Boston, Mass.

A large amount of new machinery is being installed in the Pittsburgh plant. Several new products are being brought out which will be added to the line or which are accessories for the present line.

The Pittsburgh Division of the Pittsburgh Equitable Meter Co. was founded by the late George Westinghouse. The company has been a pioneer in the development of water, oil and gasoline meters. The Merco Nordstrom Valve Co. was founded by S. J. Nordstrom, who invented the sealed port type of lubricated plug valve and is responsible for the many improvements which have been made in the last fifteen years. Both companies have the latest improved machinery for manufacturing their products and each company maintains fully equipped chemical and mechanical laboratories for its particular purposes.



THE NEW F-M HIGH EFFICIENCY CENTRIFUGAL PUMP

High Efficiency Characterizes New Centrifugal Pump

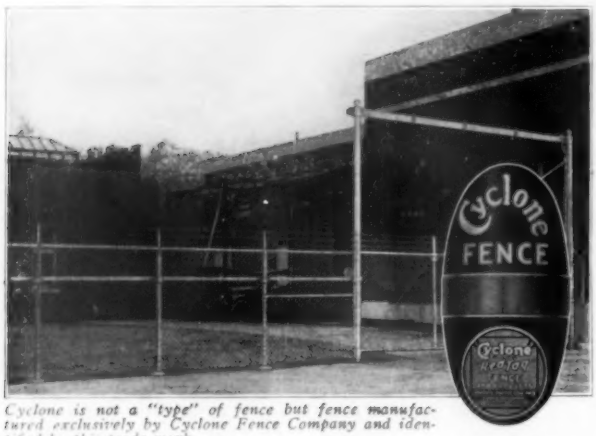
A new split case model centrifugal pump based on a vast amount of experimental field research over a period of several years has been announced by Fairbanks, Morse & Co., 900 South Wabash Avenue, Chicago, Ill. Accurate stream-lining of flow not only results in a high built-in efficiency but also reduces the tendency toward cavitation; thus the pump performs under a wide range of suction and discharge conditions without noise or vibration. As a result of this, pitting, which usually accompanies cavitation, is eliminated. The high efficiency so carefully built into the pump is sustained, since it is not dependent on close clearances at the wearing rings or on a high polish of impeller or volute.

The new pump carries ballbearing construction another step forward. A sturdy cartridge type bearing makes it possible to remove the entire rotating element without disturbing the alignment or accidentally introducing dirt or grit into the bearing housings. It has a liberal stuffing-box, of full capacity, which is scientifically sealed and lubricated. The heavy casing wearing rings are of new design and are prevented from rotating with the impeller by a semi-circular locking collar. This same idea is used in holding the packing retaining ring in place. The removable impeller wearing rings are of heavy proportions and are fitted onto the impeller eyes mechanically. Extra-heavy shaft sleeves hold the impeller, which is feather-keyed to the shaft, in a permanent longitudinal position. These shaft sleeves are themselves held in place by long hexagonal nuts which serve the additional purposes of water throw rings and bearing pullers.

THREE FACTORIES OF THE PITTSBURGH EQUITABLE METER CO.—MERCO NORDSTROM VALVE CO.

Left, Oakland, Calif. Right, Pittsburgh, Pa. Center, Tulsa, Okla.

WHY A CYCLONE FENCE?



Cyclone is not a "type" of fence but fence manufactured exclusively by Cyclone Fence Company and identified by this trade mark.

because Cyclone assures and guarantees satisfaction. A guarantee that only could be backed up by a product made in the best possible way with the best possible materials. Cyclone Fence gives many additional years of service because it is made of copper-steel, heavily galvanized, and erected on H-column posts, set in concrete foundations—

because Cyclone Fence—is erected by crews trained in Cyclone factories. Not a chance of a slip-up in the work! Not a chance for poor execution! And you are freed from the bother and care of hiring men or superintending work.

because—despite being a better product, backed by better service—Cyclone Fence costs you no more. . . . No matter how large or small your requirements, no matter how "different" they are—we would like to render you the same service that has pleased so many others. Write—

BE SAFE. SEE THE CYCLONE REPRESENTATIVE BEFORE YOU ORDER. Before you buy fencing at any time, at any price, for any purpose, why not confer with the Cyclone Representative in your locality! He is especially familiar with your requirements—and will furnish an estimate without cost or obligation.

CYCLONE FENCE COMPANY
General Offices: Waukegan, Ill.
Branch Offices in All Principal Cities
SUBSIDIARY OF UNITED STATES STEEL CORPORATION
Pacific Coast Division:
STANDARD FENCE COMPANY
Oakland, Calif.

Cyclone Fence
REG. U.S. PAT. OFF.

JOSLIN
Street Signs

10 POINTS of SUPERIORITY
1—Easily read
2—Weather proof
3—Unaffected by atmosphere
4—Do not chip, crack or break
5—Rigid construction and assembly
6—Du Pont Duco finish
7—Copper Bearing Galvanized Steel
8—Galvanized Steel Parts
9—99.4% pure aluminum
10—10-Year guarantee

For further information consult THE MUNICIPAL INDEX.
Send for literature and prices.
A. D. Joslin Mfg. Co., Manistee, Mich.

EQUIPMENT
FOR TREE SURGEONS

We offer to the Tree Workers of America, a complete line of Tools and Equipment for Spraying, Feeding, Bolting, Bracing, Cabling, Pruning, Cavity Repair, etc. Practically all Tree Treating requirements of Park and City Departments can be filled from our stocks.
Let us know your needs.

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STAMFORD, CONNECTICUT

The "Century" 100% Uniform Bow

Endorsed by the best dressed uniform organizations in United States and Canada.
—holds its shape
—made of genuine leather
—never cracks or discolors

"Once Worn—Always Worn"

Send 50c for sample and write for quantity prices

THE "CENTURY" TIE COMPANY
9377 Woodside **Detroit, Mich.**

—WHERE AM I, MISTER?—

How often is that question asked in YOUR city, not only by strangers in town, but by your own citizens living in other sections? And all because your streets are not properly marked!

Our latest development in street signs will allow you to erect them on every corner.

Write for particulars

A four-way porcelain enamel sign, in aluminum holder, ready to mount on 2-in. post, complete, in reasonable quantities **6.50**

—ROCHESTER STREET SIGNAL CO.—
396 Platt Street **Rochester, N. Y.**

A New Bituminous Sewer Joint Compound

The manufacturers of Hydro-Tite, a self-calking joint compound for cast iron pipe, have announced a new bituminous joint compound for tile or concrete sewer pipe, under the name Sani-Tite. The Hydraulic Development Corporation, 50 Church St., New York, manufacturers of both Hydro-Tite and Sani-Tite, announce that this new sewage joint compound meets all standard specifications and that it makes strong watertight joints and adheres tenaciously to both tile and concrete and has high hydrostatic and tensile strength. It resists the alkalinity or acidity of sewage and the adjacent ground, and its character makes it impossible for tree roots to enter the sewer lines. It permits a reasonable amount of flexibility without sacrificing the strength of the line, and at the same time prevents infiltration, even after considerable settlement in the pipe line. Sani-Tite sets quickly after the joint is made, and does not become brittle or deteriorate with age.

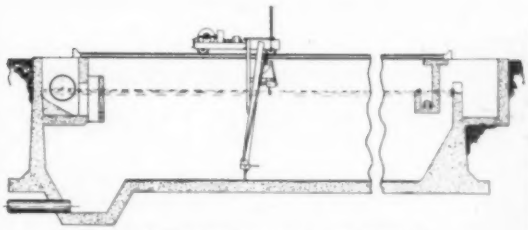
GENERAL VIEW OF THE MORRISTOWN, N. J., SEWAGE TREATMENT PLANT, WITH A HARDINGE RECTANGULAR CLARIFIER IN THE FOREGROUND

A Rectangular Sludge Clarifier

A rectangular clarifier consisting of a traveling bridge crane, spanning a rectangular tank and carrying the sludge scraper and skimmer, has been developed by the Hardinge Co., Inc., York, Pa. The scraper mechanism moves the settled solids in a sewage treatment plant toward a discharge hopper, which may be located at either end of the tank or in the center. The entire floor of the tank is cleaned each time the scraper passes down. As the carriage reverses, the blade is turned so as to cause no resistance, and is automatically lowered when the carriage once more moves toward the hopper.

A scum skimmer at the surface operates in a similar manner. The surface is kept clean of any unsightly collection of floating sludge on the tank edges or the moving parts.

The machine is fully automatic in operation and is not easily damaged if foreign material is dropped into the tank. The scraper moves only one-third as fast as the outer section of a circular clarifier scraper, thus reducing agitation, increasing the collection efficiency of the machine and increasing the density of the sludge removed.



A CROSS-SECTION OF A HARDINGE RECTANGULAR CLARIFIER

A New Type of Residual Chlorine Comparator

The ortho-tolidin test, generally accepted as the most accurate measure of residual chlorine in treated waters, forms the basis of the new chlorine comparator made by Wallace & Tiernan Co., Inc., Newark, N. J. Preparation of liquid color standards is unnecessary. The use of non-fading, accurately calibrated glass color standards reduces both the time and number of operations formerly required to make routine tests. This self-contained pocket unit encourages more frequent tests because of its extreme simplicity.

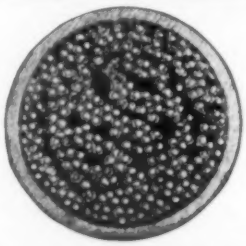
The color plates are revolved in a circular disc in front of the sample, and give direct readings of residual chlorine in parts per million through an opening in the front of the case. The use of two tubes, one for the sample containing ortho-tolidin and one for an untreated sample, insures accurate readings in spite of colored or turbid waters. Inexperienced operators at water and sewage plants and attendants at swimming pools can use this device after a few minutes' study. While complete in every detail, it is small enough to be carried easily in a coat pocket or bag. The entire unit is enclosed in a durable, corrosive-resistant Bakelite case. Thus a substantial unit is offered which can be easily carried from one point to another for quick tests.

Eastern Sales Districts of Diesel Manufacturer Rearranged

McIntosh & Seymour Corporation, Auburn, N. Y., has announced a rearrangement of its eastern and New England sales districts. The eastern district, comprising the states of New York, Pennsylvania, New Jersey and Connecticut, is now in charge of H. C. Lenfest, with headquarters at 30 Church Street, New York. The New England district, comprising the states of Massachusetts, Maine, New Hampshire, Vermont and Rhode Island, is in charge of F. C. MacKrell, with headquarters also at 30 Church Street, New York.

THE NEW W & T COAT POCKET CHLORINE COMPARATOR UNIT

ACTION PICTURE OF ONE OF THE 162 AUTOCAR FLUSHERS DELIVERED TO THE SANITATION COMMISSION OF NEW YORK CITY
These Autocar trucks have a wheelbase of 192 inches and are equipped with 2,000-gallon Hvass water sprinklers and street flushers



For Supervisory or Miniature Control
LATOX LEAD COVERED CABLE

Many of the smaller substations of electric light and power companies and electric railways are operated by so-called "supervisory control" from the load dispatchers office - which may be located a mile or more from the substation. Switches, transformers, cable circuits, and metering devices are "cut in" and "cut out" through sensitive relay apparatus which usually operates at 125 volts A. C. or 250 volts D. C. with very small current values - 1/4 ampere or less.

LATOX Lead Covered Cable is a new, dependable type of cable for supervisory or miniature control service. The copper conductors are insulated with a thin layer of LATOX, a new type of rubber insulation made directly from rubber latex.

The insulated conductors combine the advantages of rubber and paper insulation. LATOX rubber insulation is put on the conductors evenly and thinly to obtain the light weight and small diameter of paper insulated cables and has the dielectric strength of rubber insulation which insures against voltage breakdown. LATOX insulation does not absorb water. It is practically pure vulcanized rubber, has exceptionally long life and retains those qualities which make rubber the best insulation yet devised for wires and cables.

Further information will be furnished upon request.

SIMPLEX WIRE & CABLE Co

MANUFACTURERS

79 SIDNEY ST., CAMBRIDGE A, BOSTON, MASS.

NEW YORK CHICAGO CLEVELAND
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PERMANENCE

Is an inherent characteristic of Brass street signs. Brass, the non-corrosive metal, is used in their construction.

Write for a list of Brass street sign installations that have stood the test of time.

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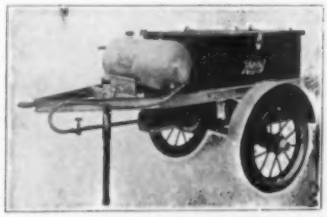
Department H East Chicago, Ind.

GET THE WHOLE STORY
ABOUT HOTSTUF EQUIPMENT



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TOOL HEATERS
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TOOL TRAILERS
PAVING TOOLS and POURING POTS

CATALOG ON REQUEST

Dealers in Principal Cities

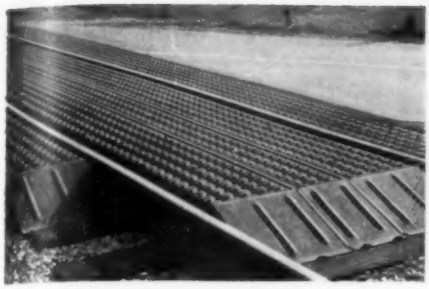
MOHAWK ASPHALT HEATER CO.
Schenectady New York

In Boston It's
The KENMORE

One of Boston's newest and finest Hotels

ADMIRABLY located in the heart of Boston's Back Bay district. This four hundred room hotel offers the traveler deluxe accommodations at moderate rates.

Let us send you a booklet on "Historical Boston"



AN EASY-RIDING HIGHWAY AND RAILROAD CROSSING

A Highway Rail Crossing

The paving of highway and railroad crossings is most important to highway traffic. The Smithsteel highway-rail crossing has been developed by the A. O. Smith Corporation, Milwaukee, Wis., to furnish a strong but light sectional steel unit which requires no special tools to install and is easily taken apart. The crossing is furnished complete by the manufacturers, down to the top of the ties; it is only necessary to spike it when putting it in place. No shims or extra materials are needed, because the parts are made to suit the height of the rail for each individual installation.

Since no part of this crossing weighs over 50 pounds, a crane is not necessary for its installation. The usual tools available to a section crew are all that are needed. Three or four men can lay a crossing in three or four hours. The crossing can be dismantled and reassembled as easily and quickly as the original installation is made. Once installed properly, it requires no attention for long periods. It provides as smooth riding as a good pavement, and the wearing surface is designed to be non-skid under all weather conditions.

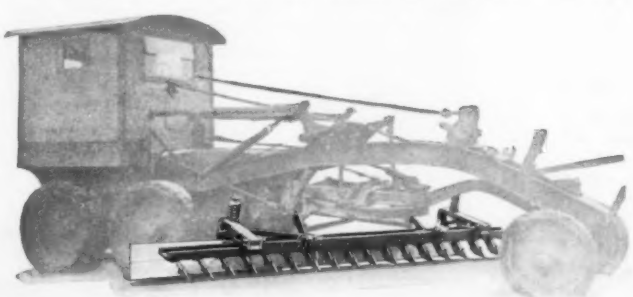
A Surfacing Attachment for Road Graders

A patented attachment for power graders built to evenly slice off the corrugations and inequalities in gravel roads without moving the material to one side or the other has been announced in the Diamond surfacing device, made by the Diamond Iron Works, Inc., Minneapolis, Minn.

The Diamond surfacing attachment is a strongly built device replacing the regular mold-board and blade on road graders. It is constructed and mounted as a single unit, but consists of two distinct parts, a planer and a troweller. The planer blades are carried at such an angle with relation to the perpendicular and to the line of travel as to make them self-sharpening. The cuts are made just to the bottom of the corrugation, except in special cases where it is desired to bring up dirt or clay to mix with the gravel for binder.

The troweller follows just back of the cutter and, owing to its angle, levels and compresses the material. The pressure of the troweller upon the ground can be predetermined and is constant, owing to the adjustable spring tension provided. The troweller also separates the stones and carries them to one side or can be set to carry along any amount of dirt or gravel as required.

The multiple cutter-bar and troweller are also effective in road-oiling treatment, for the gravel is not moved off the surface and then back again, but the action of the blades is to thoroughly mix the oil and gravel over the whole surface, and of the trowel to level, compress and smooth the mixture in one operation immediately behind the oiler.



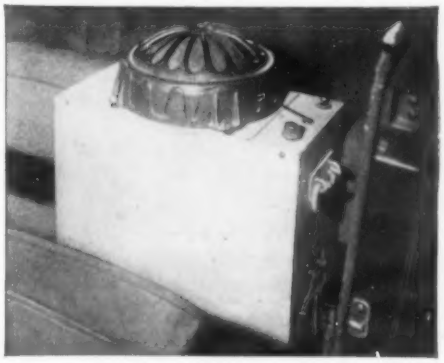
THE NEW DIAMOND SURFACING ATTACHMENT FOR GRADERS

A New Police Radio Receiver

Experience with police radio systems has shown that the compactness of radio receivers and other equipment is a prime essential for obtaining the best servicing results. A particularly compact police radio receiver has been designed by the Stromberg-Carlson Telephone Manufacturing Co., 100 Carlson Road, Rochester, N. Y., in conjunction with the Rochester, N. Y., Police Department. The receiver, together with the B and C batteries, filters, terminals, etc., is mounted in a heavy sheet steel box. The box is 20 inches in length, 15⅝ inches in height and 9⅛ inches in depth, so that it can be installed between the front and rear seats of a sedan or in a corner of the rear deck of a coupé or roadster. Removal of one side of the box makes every part accessible for quick servicing.

In order to further simplify this system, the loud speaker and potentiometer control and switch are mounted directly on top of the box, eliminating all the wiring which is necessary when the loud speaker is placed in the roof of the car and the potentiometer control and switch is placed on the steering post or dashboard. In the coupé or roadster installations, an outlet to the rear deck can be cut through the compartment directly behind the back of the seat, and through this opening the radio receiver can be operated. Two handles, one at each end of the box, make it possible for the receiver to be changed from a service car to a patrol car with minimum difficulty. The only connections that have to be made are to the antenna and ground. Antennas, consisting of ordinary chicken screen wire or copper mesh screen, are installed in the roof of the car. This type of system makes installation simple and necessitates a minimum amount of wiring, reducing the cost. With the entire equipment installed inside the car, temperature variations do not affect tubes, batteries, etc.

Radio receivers of this type are becoming essential in police equipment.

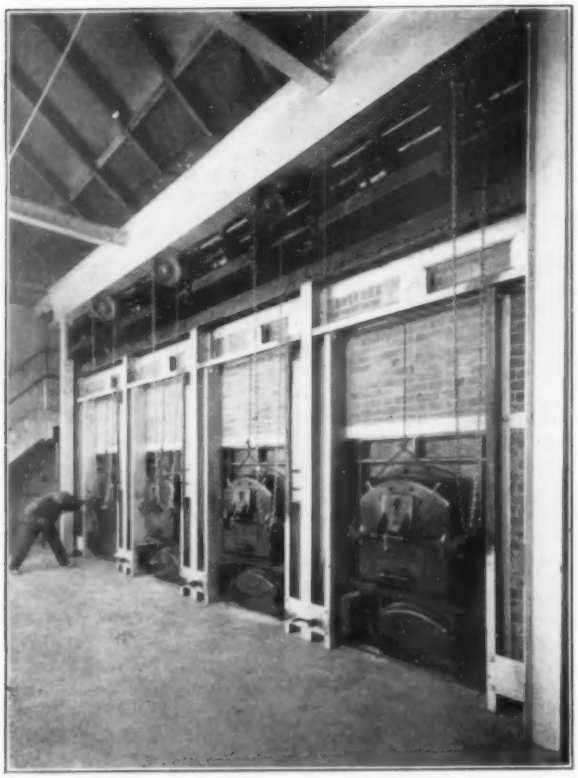


THE STROMBERG-CARLSON POLICE RADIO RECEIVER

New Standards for Lead Pipe for Domestic Services

As an aid to consumers and to minimize the likelihood of purchasers selecting lead pipe of improper weight, principal manufacturers are adopting a new standard of lead pipe sizes and weights which has been approved by the Lead Industries Association. The most important feature of the new standard is that all sizes of lead pipe in the A, AA, and AAA classifications, or "Strong," "Extra Strong," and "Double Extra Strong," will now safely withstand constant cold water pressures of 50, 75 and 100 pounds per square inch, respectively. Heretofore the safe working pressure of these classes of lead pipe has decreased as the diameter of the pipe has increased, and has occasionally led to the use of pipe too light for the service desired. In addition, numerous variations in pipe sizes formerly found among lead pipe manufacturers have been eliminated.

As the principal changes occur in the wall thickness of sizes from 1¼ to 2-inch, alterations made in sizes below 1¼-inch are slight and small in number, being made to introduce a uniformity not formerly existing. The new standard is given in tabular form on the following page for ⅜-, ½-, ⅝-, ¾-, 1-, 1¼-, 1½-, 1¾-, 2-, 2½-, 3-, 4-, 5- and 6-inch inside diameter pipe.



Stoking Room of the Dunbar Place (Eastern) Incinerator. Note the four mutual assistance cells in the furnace; the ease of stoking; the well lighted and ventilated working space; the sturdy reinforced construction and well built masonry.

Two 100 Ton "PDM" Incinerators Help to Make Cincinnati a Cleaner City

Since 1924, the engineers and designers of the Pittsburgh-Des Moines Steel Company have been studying and improving the construction and operation of municipal incinerators. In these eight years, they have erected over 60 municipal garbage disposal plants throughout the country.

The "Pittsburgh-Des Moines" incinerator is simple to operate and almost "foolproof." **All dried garbage is utilized as fuel.** It operates efficiently and at low cost — with no smoke, no odors, and no fumes. In many cities "Pittsburgh-Des Moines" plants are located close to the business section or residence district with no complaints from odors or smoke. Modern design, scientific operation, and appropriate landscaping make the "Pittsburgh-Des Moines" plant a distinct civic improvement.

Exterior view of the Dunbar Place (Eastern) plant showing driveway and collection truck entrance. Note the modern building design and large-diameter radial brick chimney. The western Cincinnati plant is located on Cruikshank Road.

Pittsburgh-DesMoines Steel Company

Room 941, 270 B'way
New York, N. Y.
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Des Moines San Francisco
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NEW Complete Line of Bituminous Road and Street Machinery

FOR MAKING HOT AND COLD MIXES

All Portable

Road Mix Pavers
Central Cold Mixing Plants
Pug Mill Mixers
Pre-Mix Plants, Hot and Cold
Driers for Sand and Stone
Street Repair Patchers
Asphalt Plants
Tar Kettles, with Spray Pumps
Surface and Tool Heaters

Descriptive Catalog Free on Request

Chausse Oil Burner Company

Elkhart Indiana

Bends? - - - - Yes
Breaks? - - - - No!

Use Huntsville Fiber in your street brooms—give it the hardest kind of service—it will still be the longest-wearing broom fiber you have ever seen!

Write for a copy of "The Story of Huntsville Hickory," which tells *why*.

Huntsville Fiber & Veneer Works
Frank H. Ford, President
Huntsville, Alabama

HUNTSVILLE HICKORY — THE *Faultless* FIBER FOR STREET SWEEPERS

LEAD PIPE SIZES

Lead Industries Association Standard

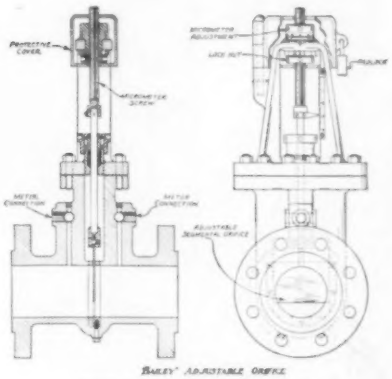
Size Inside Diameter	Classification East	West	Outside Diameter	Wt. per Ft. Lbs.	Oz.
⅛-in.	E	AQ	.520 in.		8
	D	XL	.549		10
	C	L	.577		12
	B	M	.631	1	
	A	S	.725	1	8
	AA	XS	.811	2	
	AAA	XXS	.888	2	8
¼-in.	E	AQ	.628		9
	D	XL	.666		12
	C	L	.712	1	
	B	M	.756	1	4
	A	S	.798	1	8
	AA	XS	.876	2	
	AAA	XXS	1.012	3	
⅜-in.	E	AQ	.765		12
	D	XL	.803	1	
	C	L	.881	1	8
	B	M	.953	2	
	A	S	1.019	2	8
	AA	XS	1.082	3	
	AAA	XXS	1.137	3	8
½-in.	E	AQ	.906	1	
	D	XL	.940	1	4
	C	L	1.006	1	12
	B	M	1.068	2	4
	A	S	0.156	3	
	AA	XS	1.212	3	8
	AAA	XXS	1.336	4	12
1-in.	E	AQ	1.192	1	10
	D	XL	1.232	2	
	C	L	1.284	2	8
	B	M	1.356	3	4
	A	S	1.428	4	
	AA	XS	1.492	4	12
	AAA	XXS	1.596	6	
1¼-in.	E	AQ	1.442	2	
	D	XL	1.486	2	8
	C	L	1.528	3	
	B	M	1.592	3	12
	A	S	1.670	4	12
	AA	XS	1.765	6	
	AAA	XXS	1.889	7	12
1½-in.	E	AQ	1.740	3	
	D	XL	1.776	3	8
	C	L	1.830	4	4
	B	M	1.882	5	
	A	S	1.984	6	8
	AA	XS	2.076	8	
	AAA	XXS	2.272	11	4
1¾-in.	D	XL	2.024	4	
	C	L	2.086	5	
	B	M	2.146	6	
	A	S	2.193	6	12
	AA	XS	2.404	10	8
	AAA	XXS	2.624	14	12
2-in.	E	AQ	2.185	3	
	D	XL	2.284	4	12
	C	L	2.354	6	
	B	M	2.419	7	
	A	S	2.503	8	12
	AA	XS	2.751	13	12
	AAA	XXS	3.008	19	3
2½-in.			2.75	5	
			3.00	10	
3-in.			3.25	6	
			3.50	12	
4-in.			4.25	7	
			4.50	16	
5-in.			5.25	9	
			5.50	20	
6-in.			6.25	11	13
			6.50	24	2

Lead pipe in sizes and weight per running foot other than indicated made to specification.

The new standard was adopted January 28, 1932, and is being used by the National Lead Co. and all its subsidiaries, The Eagle-Picher Lead Co., Northwest Lead Co., American Smelting & Refining Co., Andrews Lead Co., Rochester Lead Works, Fleck Brothers Co., Federated Metals Corporation, and General Lead Mfg. Co. and others, according to a report of the Lead Industries Association.

Wilson Opens Consulting Office

P. S. Wilson, former superintendent of operation of Community Water Service Co., is now engaged in sanitary and hydraulic engineering, particularly as a consultant on general management of public water-supply systems, including both engineering and commercial features, at 325 Washington Street, Glen Ridge, N. J.



THE BAILEY ADJUSTABLE ORIFICE

An Adjustable Orifice for Water Measurements

For fluid meter installation such as large water meters where it is desirable to obtain accurate measurements over a wide range of capacity, an adjustable orifice has been designed by the Bailey Meter Co., Cleveland, Ohio. The Bailey adjustable orifice is suitable for low or high pressures. The orifice consists of a flanged body with integral meter connections. It can readily be installed in a water line and connected to any differential head type of fluid meter. The adjustable orifice functions similarly to the fixed type of Bailey segmental orifice. A micrometer adjusting screw permits setting the height of the gate segment within 0.001-inch. When it is advisable to change the capacity of the meter, it is simply necessary to set the micrometer screw at the reading corresponding to the desired maximum capacity, as obtained from curve sheets furnished with the orifice.

The adjustable orifice permits the changing of the maximum capacity of the meter as much as 40 to 1 and consequently is equivalent to a very large number of fixed orifices. The change may be made in a few minutes without disrupting meter operation or diverting the flow through a by-pass line.

New Refuse Truck Handles Individual Cans

A new development in a street sanitation truck body has been announced by the Automatic Loader Corp., 41 76th Street, Brooklyn, N. Y. This body is equipped with an automatic ash and garbage loader which handles the individual refuse cans. The truck proper conforms to the latest New York City specifications for closed refuse truck bodies, except that the sliding side doors have been omitted and provision made instead for the elimination of dust, noise and the lifting of heavy cans by employees.

The refuse cans are put on elevator platforms almost level with the street curb and automatically lifted up and discharged through manholes in the top of the truck body and returned. Both sides of the truck are so equipped for use on one-way streets. Each elevator accommodates two cans at a time and averages 15 seconds for the round trip. The elevators are recessed into the truck body so that no protruding parts obstruct traffic. Variations in the size of the ash cans are taken care of so that the elevators automatically adjust themselves to the cans and lock them in a foolproof manner. The mechanism, which is operated hydraulically, is simple and efficient.

The refuse does not come into contact with any moving parts, but is thrown in through shielded openings to prevent dust from being carried along by the wind. The motion now used by employees for shaking the cans where the contents have a tendency to stick can be simulated effectively by moving the operating lever up and down, and there is no possibility of damage to the cans. The motion of the elevator is due to the telescopic construction of the hydraulic jacks, rather slow at the beginning and at the end of travel, so that there is no danger whatever of injury to casual bystanders.

The 14-cubic-yard body is mounted on a standard hydraulic dump hoist and has no features that will prevent its use on any type of chassis.

A NEW AUTOMATIC-LOADING REFUSE TRUCK

Reorganization Plan Announced

The American Road Machinery Co. and The Good Roads Machinery Co., Kennett Square, Pa., report that the reorganization plan of these two companies, contemplating their consolidation into one company known as the Good Roads Machinery Corporation, will soon be completely effected. The new corporation has been chartered and has taken over the sale of all the products of the former companies. A number of improvements in the products are reported, details of which will be announced soon.

-'way back in 1888

—a year famous for the big blizzard—the defeat of Grover Cleveland for the presidency—the shutting off of Chinese immigration—and the re-surfacing of Bryden Road, Parsons Avenue to Twenty-second St., Columbus, Ohio, with Trinidad Sheet Asphalt.

* * * *

That pavement was put down just forty-four years ago and the lake asphalt which was used to re-surface the old cobblestone pavement is still in service. Here and there you'll find a patch but it is a truly remarkable testimonial to Trinidad Lake Asphalt to find that this street has given such long service with comparatively low maintenance costs.

Bryden Road has been subjected to increasingly heavy traffic every year. Just to give you an idea of the traffic passing over this street it will be interesting to note that a count taken recently showed that more than 11,000 motor cars and trucks passed the intersection of Bryden Road and Parsons Ave. in thirteen hours.

You can get long-life, low maintenance streets by specifying Trinidad Lake Asphalt . . . the asphalt that is different . . . the only asphalt with a naturally occurring colloidal filler which is a contributing factor to the long life of millions of square yards of Trinidad Lake Asphalt streets and roads throughout the United States and foreign countries.

Write for complete information regarding the remarkable record of Trinidad Lake Asphalt pavements.

THE BARBER ASPHALT COMPANY
PHILADELPHIA
NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO

TRINIDAD
NATIVE LAKE
ASPHALT

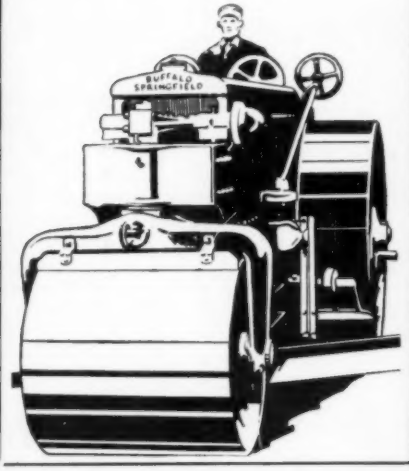
BUFFALO SPRINGFIELD

STANDARD...

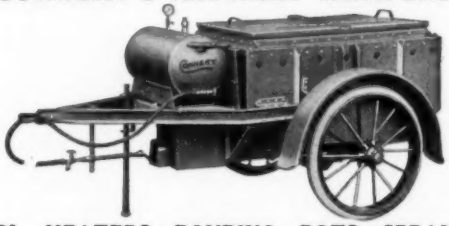
Leadership is usually of short duration. Champions come and champions go in never-ending procession. Not so of the Buffalo-Springfield roller. It has held its rating as the premier roller for decades—is the leader today—will still be, we pledge you, the best roller a generation hence.

Three wheel and tandem models, steam or motor driven. All practical sizes and weights. Scarifier and other attachments, as desired.

The Buffalo-Springfield Roller Co.
Springfield, Ohio



CONNERY'S ASPHALT HEATERS



TOOL HEATERS—POURING POTS—SPRAYING OUTFITS
Lead Melting Pots—Oil Burners—Torches
Write for Catalog
Connery & Company, Inc.
4000 N. Second Street, Philadelphia, Pa.

HOT SPRINGS

The world-renowned Hot Springs of Arkansas, 46 in number, have for ages brought relief to countless thousands. Wishing to preserve these waters for the benefit of the public for all time, the U. S. Government set aside over 900 acres embracing the Hot Springs and surrounding mountains from which they gush, creating Hot Springs National Park, the first government-owned health and pleasure resort established in North America.

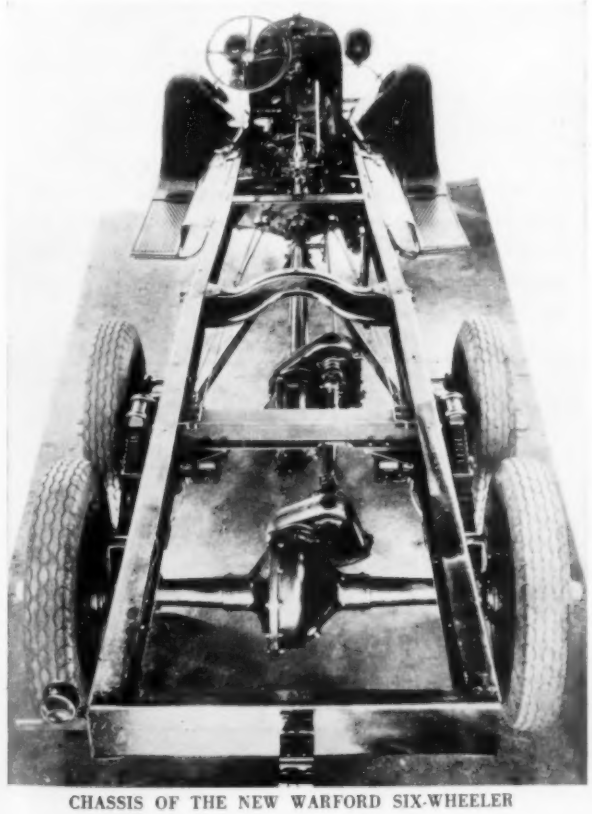
The Majestic offers a wide choice of accommodations from single rooms, with or without bath, to beautifully furnished 2, 3 and 4-room apartments, assuring maximum comfort amid attractive surroundings. Rates are surprisingly moderate. Two restaurants serve excellent food.

MAJESTIC HOTEL

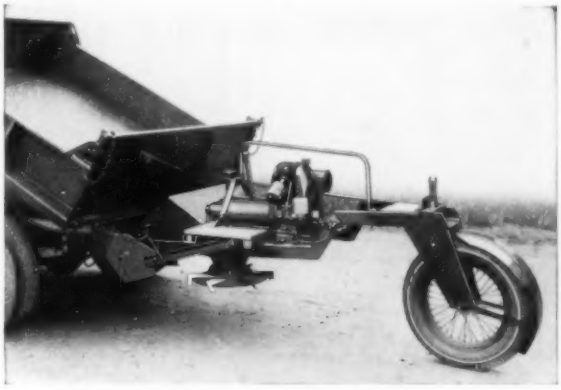
Converting a Light Truck to a Powerful Six-Wheeler

Converting a Ford truck into a six-wheel unit capable of carrying 3½ to 5 tons is made possible by the Warford six-wheeler unit which has recently been announced by the Warford Corporation, 44 Whitehall St., New York. This unit extends the wheelbase 43¾ inches, and the wheel centers 40½ inches. The Warford six-wheel unit consists of a new Model AA Ford with the rear axle completely equipped with a right-hand and left-hand torque arm assembly, Warford spring seats, two Bendix cable brakes complete, and two special Warford wheel hubs with brake drums attached. Assembled to this axle is a rear gear set, consisting of a housing, gears, bearings, etc. The front gear case with bearings, gears, throw-out clutch, etc., is semi-assembled before shipping to the purchaser. The necessary spring seats, extra leaves for the springs, torque tube conversion parts, and shift lever for the cab with rods and fittings, frame side rails, cross-rails, bolts, and all parts of spring seats with cross-supports, are provided. An oversize and longer torque tube drive shaft is furnished. Both driving and braking torque from the rear axle are taken through the frame by the direct radius rod equipped with oversize ball-and-socket joints.

This six-wheeler unit provides two gear-driven axles, or one, as conditions may require, two differentials working independently, supplying traction for any hauling needs. It gives four-wheel drive with six-wheel capacity, six-wheel brakes, plenty of room for large bodies, and the opportunity to carry heavier loads. The driver has the choice of driving through the two rear axles or only one, just by moving a lever in the cab.



CHASSIS OF THE NEW WARFORD SIX-WHEELER



THE HERCULES DITWILER SPREADER ATTACHED TO A LIGHT TRUCK

A Trailer Type Spreader

A new trailer type spreader which is of interest to municipal street departments for handling chloride for dust prevention or for spreading salt, sand, cinders or chloride on icy streets or for use by contractors in spreading chips, slag or other covering on penetrated stone, has been announced by the Ditwiler Manufacturing Co., Galion, Ohio. Its distinct difference from other spreaders is that it is operated by its own air-cooled motor, and the width of spread from 6 to 30 feet is regulated by the speed of the motor and is always uniform, regardless of the speed of the truck. It is quickly attached to any dump truck and is supported in part by the truck and in part by the rear wheel of the spreader, which carries a standard automobile tire.

The Hercules-Ditwiler spreader is designed especially for use with lighter dump trucks, but by a simple adjustment it can be used as readily with larger trucks. Agitator blades in the feed hopper give the material a rotary motion and break up any lumps which may have formed. An additional hopper is supplied for use in spreading calcium chloride from non-dumping truck bodies. This spreader requires only a small permanent attachment on the trucks being used, and it can be attached to each truck in turn in less than one minute. Adjustable legs are used to support the front of the spreader when it is detached from the truck. The spreader, including the engine and hopper, weighs 535 pounds. It trails back and manipulates readily at all truck speeds, whether in operation or in moving from one place to another.

This spreader attached to a light truck with balloon tires may also be used in parks and golf courses for spreading ground lime or fertilizer.

More Autocars for New York

The Sanitary Commission of New York City has given an additional order for nine heavy-duty motor-truck chassis, for street-cleaning purposes, to the Autocar Company, Ardmore, Pa., according to H. M. Coale, Vice-President in charge of sales. This order, with a recent one covering 162 chassis for street flushing, brings the city's Autocar fleet to 461. N. P. Nelson Iron Works, Inc., Passaic, N. J., will provide the specialized street-cleaning equipment for the trucks.

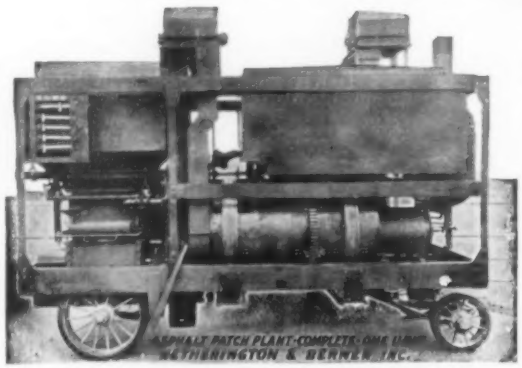
Torrence Made President

Link-Belt Co., Chicago, Ill., has announced the election of George Paull Torrence, Vice-President in charge of the company's Indianapolis operations, as President of the company. Mr. Torrence has been associated with the Link-Belt Co. for 21 years.

Handling Water-Works Chemicals by an Air-Conveyor System

A pneumatic system for conveying fine granular and crushed materials containing a large percentage of dust, such as water-works chemicals, including soda-ash, hydrated lime and alum, has been developed by the Fuller Co., Catasauqua, Pa. This Airveyor system enables the filtration plant operator to eliminate bags and barrels, and dust losses, and handles the dry bulk materials direct from freight cars to the plant storage bins. The system requires little space and is adaptable to both old and new plant layouts, since the flow of material in the plant is not restricted by limitations of mechanical conveyors.

One man operates the Airveyor system with little physical effort, and the complete absence of dust nuisance makes working conditions ideal. The operation, as well as the layout, is extremely flexible. The Airveyor in its simplest form comprises a positive pressure exhauster, a material collector or receiver and the necessary conveying duct, terminating in a flexible section for easy manipulation in the car. A partial vacuum in the collector and pipe line is



A Real Asphalt Patch Plant

A PORTABLE UNIT WITH A CAPACITY OF 400 YARDS PER DAY

ACCURATE CONTROL OF MATERIALS ASSURING ACCURATE MIXTURE TO COMPLY WITH ANY STANDARD SPECIFICATIONS

Send for Bulletin R-400

HETHERINGTON & BERNER, INC.

INDIANAPOLIS, IND.

Stationary — Railway — Portable & Semi-Portable Plants

ROOT

HYDRAULIC SCRAPERS

To economically maintain gravel, cinder, slag or earth streets use the ROOT Hydraulic-operated speed Scraper.

Replaces to a large extent the slow-moving tractor, covers twice the mileage at half the expense. *Send for additional information.*

ROOT SPRING SCRAPER COMPANY

Kalamazoo, Michigan

New York's Biggest Value

FINE ROOM and BATH

$2.50 SINGLE $3.00 DOUBLE

A modern, new hotel located in heart of New York, 100 feet West of Broadway yet quiet and cool. Each room has bath, circulating ice water, electric fan, Beauty-rest mattresses, exceptional furnishings and atmosphere.

Hotel Piccadilly

227 WEST 45th STREET, NEW YORK

Carey Elastite EXPANSION JOINT

makes *Good* Paving *Better*

The "sandwich" joint which protects concrete paving against expansion and contraction stresses. Proved by 20 years' use in highways and sidewalks in all parts of the world. Large stocks in principal cities insure immediate shipment. Write for catalog and 1932 prices.

THE PHILIP CAREY COMPANY

Department E-1 Lockland, Cincinnati, Ohio

Branches in Principal Cities

Do You Want Prices on Anything?

Readers of THE AMERICAN CITY desiring to secure catalog or price lists on any sort of machinery equipment or supplies for municipal or county work are invited to state their wishes to the Catalog and Price List Department, The American City, 470 Fourth Ave., New York. One letter to us will secure you the information you desire free of all charge, and at a considerable saving of time and correspondence.

Above: *McCurdy Road Guard in Use*
At the right: Collapsed for moving to the next job

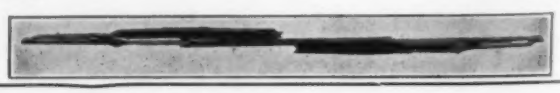
McCurdy Road Guards

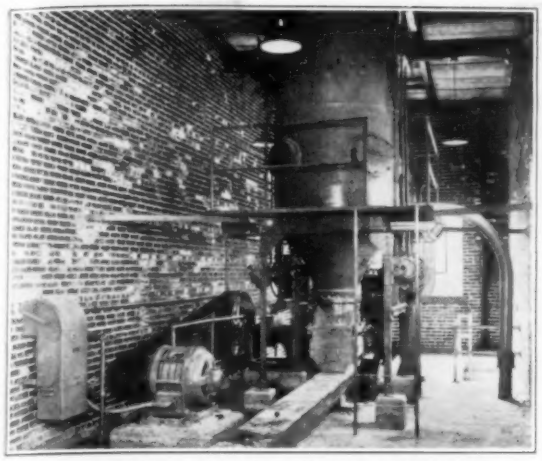
All—Steel—Adjustable—Collapsible

It's a quick and easy matter to close a street to traffic while repairs are going on, if you own a pair of McCurdy Road Guards. They are easy to transport to the job—simply carry them collapsed on your running board. You can set one of these guards up in one minute—and take it down and collapse it in one minute when the job is finished. Being made of all-steel, a McCurdy Road Guard will stand all kinds of hard knocks and won't break or wear out in many long years. It's considered everywhere the most efficient and economical road guard obtainable for street repair work. Price $5.80 each. Write for our illustrated circular.

McCurdy Steel Products Company

Ada, Ohio





A TYPICAL AIRVEYOR SYSTEM FOR HANDLING SODA ASH, SHOWING THE MOTOR IN THE FOREGROUND FOR DRIVING THE EXHAUSTER, FEEDER AND CONVEYOR

created by the exhauster to produce the necessary air velocity to draw a mixture of air and material into the nozzle and system. The material thus conveyed is discharged from the collector through an air lock feeder into a receiving bin. The filter type for handling such materials as soda-ash is built in capacities up to 15 tons per hour. A special flexible metal conduit is designed with a hardened steel overlapping liner to resist abrasion and provide smoothness, lightness of weight and ease of manipulation.

A Highway Guard Combining Spring Clips and Steel Cables

A highway guard which is furnished with a rolled steel H section post to which is attached a steel spring by means of two U bolts, has been announced by the Pottstown Metal Products Co., Pottstown, Pa. The cables pass through loops on the ends of the springs and run free in the loops. The heavy spring not only holds the cables well away from the post but cushions the force of the blow, thus protecting both the vehicle and the fence. The projection of the spring beyond the cable is only ⅜-inch.

The design of this safety highway guard is simple. There are no right- or left-hand parts, and ordinary labor can readily install the unit. The initial cost is no greater than that of the wooden post and cable construction now used by some highway departments. The maintenance costs are low, and particularly at bad curves or sections where wooden posts are frequently broken through accidents this guard has been especially recommended as giving greater strength and longer life.

A SIMPLE AND EFFECTIVE HIGHWAY GUARD

A Corrugated Metal Guard-Rail

A guard-rail made of strips of corrugated metal fastened to wood, concrete or all-metal corrugated posts by clips and springs, so that when struck by an automobile or truck, either head-on or at an angle, the guard-rail acts as a shock absorber, reducing the force of the impact, has been developed by the Toncan Culvert Manufacturers' Association, Youngstown, Ohio. This Metalflex guard-rail materially lessens the possibility of injury to occupants and of damage to a car or truck. It is installed with positive tension in each panel, not only at the posts, but on the full length of the rail. The rail itself is rigid and will not pocket, and it is not possible for a car to come in contact with any post.

The action of the Metalflex guard-rail when struck is similar to that of a curb, as the automobile tends to slide along the corrugated surface until the driver can gain control. The guard-rail is made of genuine Toncan copper Molybdenum corrugated heavy-gage iron.

METALFLEX GUARD RAIL INSTALLED BY THE KANSAS STATE HIGHWAY DEPARTMENT NEAR LAWRENCE, KANS.

Spreading Calcium Chloride at High Speed

The use of calcium chloride is of great assistance in controlling dust in summer and ice in winter on highways and streets. A new device which attaches to the rear end of any truck and distributes calcium chloride evenly has been developed by the Efficient Road Machinery Co., Inc., Syracuse, N. Y. This G. S. C. Hi-Speed spreader handles any size of material up to No. 3 crushed stone, and the depth of spread can be controlled to range from a light sprinkle to a layer several inches thick. The width of spread ranges from 1 to 8 feet. The spreader fits any truck without using any special adapters or boring any holes in the truck frame. It can be completely attached or detached by one man in 15 minutes. The spreader is controlled by the truck driver by the aid of one rope. If an extra man is used, he stands on a platform for that purpose at the rear of the truck.

This spreader is used effectively for laying down the seal coat or blotter coat after a tarring or oiling operation. This is done by running the truck backwards, and inasmuch as the spreader is carried completely by the truck, there is no picking-up of the bituminous application.

THE G. S. C. HI-SPEED SPREADER

Cement-Lined Spirally Welded Pipe

The Naylor Spiralweld truss cylinder, which is in extensive use in water, gas and oil pipe lines, is now available with a cement lining, a reinforced Gunite coating, or both, from the Naylor Pipe Co., 1230 East 92d Street, Chicago, Ill. It thus becomes a reinforced concrete pipe especially suitable for low- and high-pressure water mains and sewers and other types of service where the combined features of long life and structural strength are desired. The leak-tight metal cylinder, which may be of open-hearth steel, Toncan iron or copper-bearing steel, provides a light-weight reinforcing core, within which the dense, smooth cement mortar lining is placed by centrifugal spinning.

Outdoor Lighting

A Section of *The American City*
Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

Chicago—Largest City-Operated Street-Lighting System

WITH the addition in 1931 of 259 miles of residential electric street lighting, the city of Chicago, Ill., strengthened its position as the largest municipally owned and operated street-lighting system. The new lighting supplanted gas or oil lighting in some instances, greatly increasing the intensity of illumination; the remainder consisted of lighting installations where there had been none of any kind.

At the beginning of 1932 Chicago's total municipal electric street lighting system covered 3,600 linear miles and 210 square miles, and included nearly 93,000 electric lighting units, distributed by intensity as follows: 10,000-lumen units, 7,958; 6,000-lumen, 25,368; 4,000-lumen, 1,069; 2,500-lumen, 32,285; 1,000-lumen, 26,107. The Chicago system is exceeded in mileage and number of lamps by that of New York City, but the latter is not municipally operated, while that of Chicago is a completely public enterprise, with the exception of such gas lighting as remains, and a few isolated cases of electric lighting by contract.

The lights with their standards or other supports, the complete distribution system and 13 substations are owned, maintained and operated by the Department of Gas and Electricity, and the current supply is obtained wholesale at 3.5 mills per kilowatt hour from the Sanitary District of Chicago, which is also a public agency. This power is generated at the hydro-electric plant on the Chicago Drainage Canal at Lockport, Ill.

Electric street lighting in Chicago began in 1887, when 100 arc lights were first used to light certain bridges crossing the Chicago River. They were supplied by current from four small dynamos, operated by a 125-hp. engine in the basement of a city fire station. The outstanding steps in the development of the system are outlined in the accompanying chronology.

Prevailing Types of Units

In the business and industrial districts the standard lighting unit is now the 6,000-lumen (600-cp.), 20-amp., type C series incandescent lamp, connected to individual transformer or compensator having 10-amp. primary winding connected in series to a 10-amp. circuit. Most of the units in service are fed by overhead wires, and are supported by malleable iron brackets on tubular steel poles, the light source being 22 feet from the ground, except in the case of trolley-pole mounting, where the mounting height is 19 feet. Underground circuits are used for 3,008 units; many are on ornamental lamp standards,

Chronology of Electric Street Lighting in Chicago

1887—Chicago River bridges lighted by open d. c. arc lamps.

1897—1,438 arc lamps in service, supplied from three power stations.

1898—Two more power stations built.

1904—One more power station built.

1905—Enclosed a. c. arc lamps introduced.

1907—8,206 arc lamps in service.

1908—Sanitary District furnishes current, superseding city's steam plants.

1909—12,189 arc lamps in service.

1910—Sanitary District takes over the operation of substations.

1912—Flame arc lamps introduced, also 862 100-watt, 80-cp. incandescent lamps installed in round globes on former gas lamp posts in residential districts.

1913—System at end of year comprises 10,054 flame arcs, 6,213 enclosed a. c. arcs, 1,261 open d. c. arcs, and 3,250 80 cp. units.

TYPES FOR BUSINESS STREETS

Left—10,000-lumen, overhead circuit. Center, 6000-l., underground circuit, ornamental standard. Right, 6,000-l., overhead circuit

1914—600-cp., 300-watt, 20-amp., nitrogen-filled type C series incandescent lamps adopted as standard in place of flame arc lamps.

1915—100-cp., 75-watt, 4-amp. type C lamps standardized for small unit extensions and replacements, in place of 80-cp. units.

1916—System comprises 9,607 flame arcs, and 15,815 600-cp. and 8,900 100-cp. type C lamps. Bond issue of $3,750,000 voted for extensions. "Series group" system introduced.

1917—All flame arcs changed to 600-cp. type C incandescents.

1918—City takes over operation of substations.

1921—System comprises 26,582 600-cp. and 28,266 100-cp. units.

1922—$2,000,000 bond issue voted for extensions.

1924—Installation of 6,548 250-cp. units on concrete posts in residential district begins. Third bond issue, $1,000,000, voted.

1926—$2,000,000 bonds voted.

1927—$1,700,000 bonds voted.

1930—$2,000,000 bonds voted.

TYPES OF LIGHTING UNITS FOR RESIDENCE DISTRICTS
Left—2,500-lumen, 6.6-amp., concrete post. Center—2,500-lumen, 6.6-amp., cast iron post. Right—1,000-lumen, 6.6-amp., cast iron post

carrying a bracket from which the unit is suspended with the light source 25 feet above the ground. The 6,000-lumen units are ordinarily placed one at each intersection of two streets or of a street and an alley, with other units as necessary to provide one lamp for each 330 feet of street, or, in some cases, 220 feet. Some of these units are also used in certain residential districts that were formerly illuminated by arc lamps.

For wide thoroughfares the standard unit is a 10,000-lumen, 20-amp. lamp, mounted on a specially designed aluminum alloy bracket attached to metal poles, spaced 110 feet apart. The light source is 21 feet above the ground. There were 7,958 of these lamps in service at the beginning of 1932. They are operated with individual transformers.

Chicago boasts the most brightly lighted street in this country, and probably in the world—State Street, for a distance of 3,080 feet within the Loop District. This lighting was installed by the State Street merchants, and is maintained and operated at their expense excepting for an amount paid by the city equivalent to the annual cost of the superceded lighting. There are 140 units of 2,000 watts (45,000 lumens), mounted two to a standard, the light source being 27 feet, 9 inches above the ground. They are fed from local utility feeders. The standards are placed opposite each other, about 100 feet apart excepting for intersections, where there is one for each corner. The average spacing for the entire distance is 88 feet.

Dearborn Street also has special lighting, consisting of 103 10,000-lumen lamps, an improvement association paying the city for the additional cost.

For residential districts the standard is the 2,500-lumen, 6.5-amp. unit, of which 32,285 were in service at the beginning of 1932. This standard was adopted in 1923 after much study and experiment, and represents a distinct improvement in both illumination and economy over the previous 1,000-lumen standard. The lamps are enclosed in urn-shaped, rippled glass globes, mounted on concrete or ornamental cast iron posts, at a height of about 12 feet. The units are placed in staggered arrangement, one for each 150 feet along the street, with two to each street intersection on diagonal corners, and one at the intersection of each alley with a street. The lamps are connected in a series group arrangement with an average of about 25 lamps to each group, served by 600-volt, lead- and jute-covered cable, and a 4.2-kva. transformer. The secondary windings of these transformers are grounded at the middle point, so that the maximum voltage from the secondary circuit to ground is cut in half, thereby reducing the accident hazard. There are about 12 of these transformers, with their primary windings in series, on each 5,000-volt circuit, the latter being carried in lead-covered, steel-taped, jute-covered cable. These primary circuits are of either 6.6 or 10 amperes. Both primary and secondary cables are laid in the parkways; where streets or alleys are to be crossed, the cable is carried either in fiber conduit laid in concrete, or by steel pipe pushed from curb to curb under the pavement.

1,000-LUMEN, 4-AMP. UNIT ON CONVERTED GAS POST

The additions to this system in 1931 comprised 7,300 units mounted upright on cast iron standards 11 feet high, set in separate concrete foundations. The lamps are in urn-shaped ornamental glass globes. Besides the units themselves, the installation included 3,000,000 feet of single-conductor and 100,000 feet of 4-, 8- and 12-conductor cable, 2,500,000 feet of duct line, 225,000 feet of 2-inch pipe laterals, and 400 transformers for 180 manholes, this material as well as the standards and fittings being supplied by Westinghouse Electric & Manufacturing Co.

The number of 1,000-lumen lamps still in service at the beginning of 1932 was 26,107. Of these, 5,557 were 4-amp. series lamps, in urn-shaped, rippled glass globes, with aluminum canopies, mounted on converted gas lamp posts at a height of 9 feet, 6 inches. They are placed in staggered arrangement, with one lamp to 75 feet along the street, and with two lamps at each street intersection and one at each alley. They are supplied by 5,000-volt lead-covered, steel-

taped, jute-covered cable. The other lamps of this size, numbering 20,550, are 6.6-amp. series units, mounted on cast iron ornamental posts at a height of 10 feet, 6 inches. They are operated in the series group system, the arrangement and installation being similar to that in the case of the 2,500-lumen lamps, excepting that the transformers for the various groups are 1.7-kva. for circuits of less than 23 lamps, and 2.32 kva. with 23 to 31 lamps. The primary circuits are of 6.6 amperes.

Besides the large numbers of 2,500-lumen and 1,000-lumen units there are 1,069 4,000-lumen units at certain points in the residential districts.

There are a few areas in the city that cannot be economically served by the municipal system, but which are lighted by rented electric street lamps under contract with the Commonwealth Edison Co. In addition to a few hundred lamps of this sort there are several thousand, mostly 60-watt, used for lighting underpasses, which were installed by the city, the Edison company furnishing current.

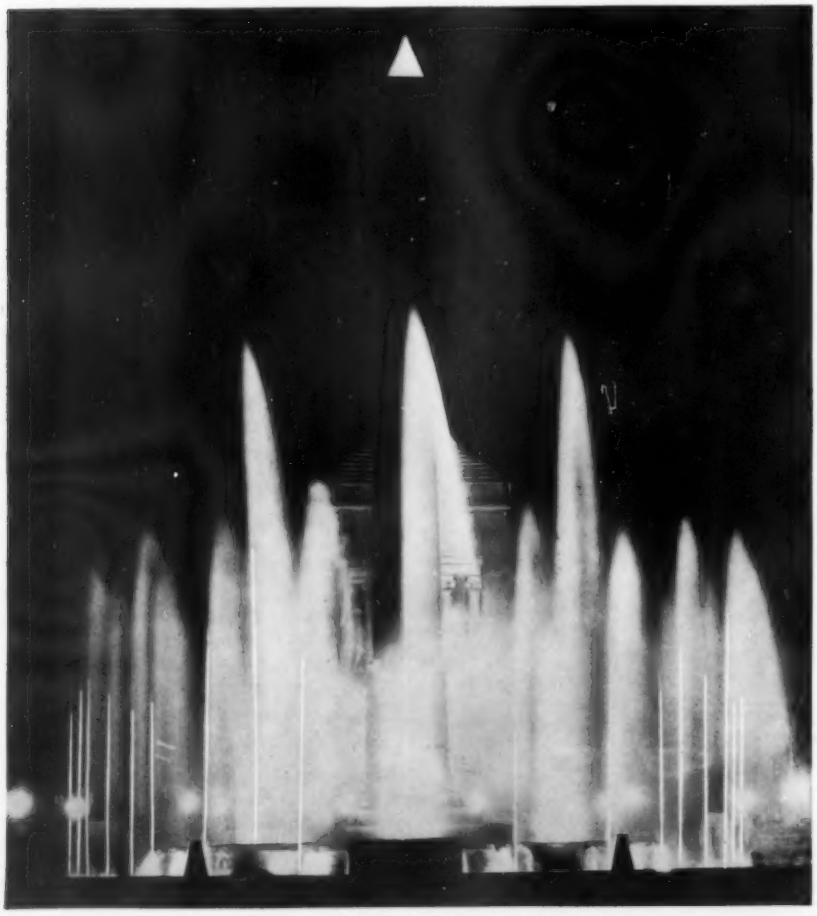
Certain outlying sections of the city are not yet served by the municipal electric street-lighting system, but are provided at present with gas and gasoline street lamps, operated under contract with the American Development Co. The lamp-posts and gas service connections are the property of the city, but the fixtures and accessories are furnished by the contractor. The gas lamps are of 50 cp. each, and are turned on and off by clock mechanically in conjunction with pilot lights. At the beginning of 1932 there were 3,435 gas lamps and 662 gasoline lamps in service, the total annual cost per lamp being $34 and $71, respectively.

The Department of Gas and Electricity, which was established in 1898, has charge of the municipal lighting system, the fire-alarm telegraph and police telephone systems, the traffic control system and the inspection of all electrical wiring, equipment and work within the city. It is headed by W. A. Jackson, Commissioner of Gas and Electricity, appointed in 1931 by Mayor A. J. Cermak.

Electric Fountains

By A. F. DICKERSON, Chief Engineer, Illuminating Engineering Laboratory, General Electric Co., Schenectady, N. Y.

SINCE the Columbian Exposition in Chicago in 1893, the electric fountain as a spectacular and popular attraction has won ever-increasing recognition. The Chicago fountains were lighted through glass portholes by arc searchlights in a compartment below the fountain basin. Color changes were accomplished through revolving color wheels, and changes in water effects were made manually. Owing to the many necessary attendants, the cost of operating fountains of this type was so high that it could be justified only by an exposition where admission was charged. Several cities, however, did make installations which cost as much as $50,000 each, but the heavy expense of operation was the obstacle to their widespread use.



ILLUMINATED FOUNTAIN IN INDIANAPOLIS, IND.

A 100-foot black obelisk tipped with gold leaf occupies the center of the Indiana World War Memorial Plaza in the heart of Indianapolis. Surrounding its pink granite base are two basins of pink Georgia marble, equipped with 40 underwater projectors that send multi-colored light upon a circle of fountain sprays

Today the electric fountain is a comparatively inexpensive municipal improvement. Highly efficient Mazda lamps in small submerged projectors have made possible complete automatic control. Even the seemingly endless variety of water effects are produced through the means of electric valves that operate from the same electric controller as the colored floodlights.

Below the basin that contains the submerged floodlights there is a chamber that houses the pump, motor, electric valves, controller and remotely controlled switches. At a convenient location in the vicinity there are several small switches, similar to those in your own home, that will start the operation of the fountain when snapped.

A few minutes for a weekly inspection and perhaps an hour each month for cleaning the outside of the projector lenses constitute most of the labor expense in the operation of the modern electric fountain. Lamps will last at least two seasons, so their cost is nominal. Electric power amounts to less than a dollar per night for the average large-size fountain; so the only major expense is the interest on the bond issue necessary to cover installation. Many foun-

IN ERIE, PA.
This $18,000 fountain costs less than a penny yearly per capita, including interest on the installation bond issue and all operating expenses

IN ATLANTIC CITY, N. J.
The water effects, produced by combinations of jets, sprays and jet rings, are lighted by submerged projectors in blue, green, amber, red and the many hues and tints obtained through combining these colors

IN ELYRIA, OHIO (Right)
Electric fountains in standardized types are now available to suit every pocketbook. One like this can be completely installed for about $5,000

IN SCHENECTADY, N. Y. (left)
After four seasons of operation this fountain, costing only half a penny yearly per capita, attracts between two and five thousand spectators nightly. The center jet has a height of 80 feet

tains are the gifts of public-spirited citizens, in which case this latter item is omitted, leaving an operating expense of only a few hundred dollars yearly.

Manufacturers now offer complete electrical and mechanical equipment for fountains of many standard designs and also all the necessary diagrams for construction and assembly. There is a size for every location for one's own garden, which may cost only a few hundred dollars, to a large lake type, costing from twenty to thirty thousand dollars.

Water effects in these designs are produced through combinations of jets, sprays and jet rings. For each water effect there is a complete cycle of color changes involving red, green, amber and blue and their mixtures, so that repetition is seldom, and is never noticed. Flasher control for color has been generally used, but for large fountains the added expense of the modern Thyratron-reactor type of control is well warranted since through its use graduations of color in the pastel shades are possible, which add materially to the display.

Beauty is an important element in the planning and development of cities. It arouses just pride in every citizen, attracts desirable residents and wins substantial credit for the responsible civic authorities. The electric fountain is an object of conspicuous beauty and public appreciation when night has veiled the city's natural and architectural attractions. As a fascinating spectacle it will bring enjoyment to many more thousands than possibly any other equal investment that a municipality can make.

Lansing Changes Its Mind

A WEEK'S trial of dimming street lights 30 per cent for economy persuaded Lansing, Mich., to abandon the experiment whereby a disproportionately meager saving was made, with serious hazards to safety. When the Council unanimously repealed the plan, the Lansing *State Journal* stated:

"Streets which had been gloomy during the test again became brightly lighted by the public lighting system which for years has been the source of much pride to citizens of Michigan's capital city. Motorists and pedestrians who had been accustomed to the safety of the bright lights joyously greeted the municipality's return to street lighting normalcy; the huge sign atop Central fire station seemed somewhat less sheepish when it broadcast its message to use more electricity." (See page 119.)

San Francisco's Bay Shore Boulevard, lighted by General Electric Company with Holophane Refractors

Another Great Boulevard is illuminated *with* HOLOPHANE *for* Safety and Economy

THIS broad, smooth highway invites the motorist to easy, comfortable driving by night. Note how the illumination is concentrated on the roadway, with sufficient secondary lighting along the sides for safety.

This installation is a further example of how both states and cities are turning to Holophane in the interests of true economy. They have found that the increasing speed of motor traffic puts an added burden on lighting—and that inadequate lighting is expensive.

Write for detailed information on any phase of street or highway illumination. You will find that Holophane Planned Lighting is always cheapest in the end.

HOLOPHANE COMPANY, Inc.

342 Madison Ave. New York City

San Francisco Works: Newark, Ohio Toronto

FOR SCIENTIFIC HIGHWAY LIGHTING SPECIFY HOLOPHANE REFRACTORS
THEY PROVIDE THE GREATEST AMOUNT OF USEFUL LIGHT

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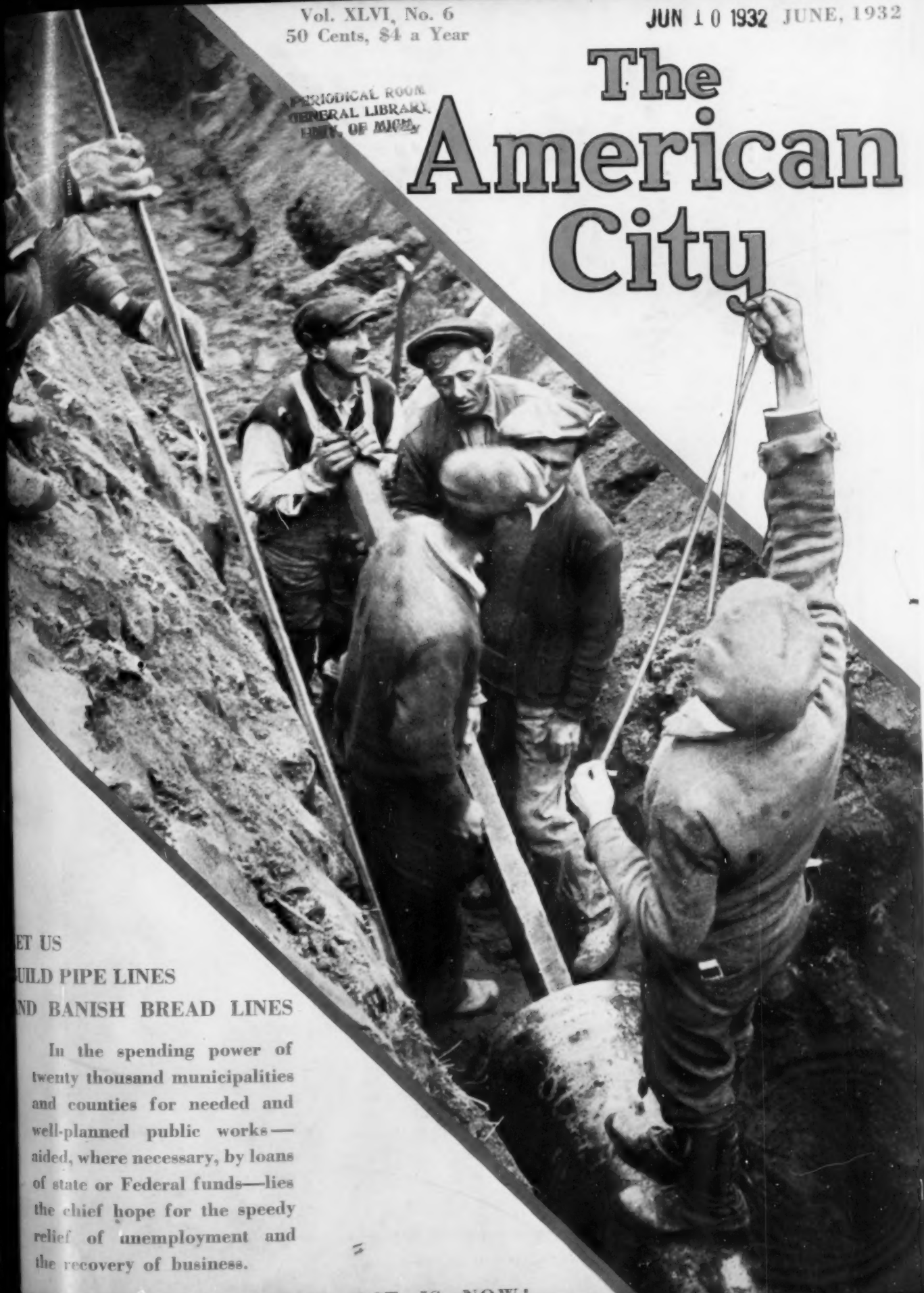

ET US
UILD PIPE LINES
ND BANISH BREAD LINES

In the spending power of twenty thousand municipalities and counties for needed and well-planned public works—aided, where necessary, by loans of state or Federal funds—lies the chief hope for the speedy relief of unemployment and the recovery of business.

HE TIME TO PLAN AND ACT IS NOW!